The Builder.

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Sculpture at the Royal Academy.

THE row of busts which used to greet, or rather to alarm, the visitor to the Academy on entering the ante-room, is now no more. The room is an ante-room simply; "merely that, and nothing more." In any case the placing together of a number of busts of more or less uninteresting persons in one long row on a shelf is not a fortunate way of disposing them. It reads like a kind of notice to visitors,—"Here are ye pot-boilers"; and it is much better to disperse them here and there among works of another class. We are led to conclude, however, that sterner measures than this have been resorted to, and that there must have been an extensive massacre of the innocents in the shape of busts, for certainly the aggregate number to be picked out from among the sculpture seems to be much smaller than it was when there was not only one row in the ante-room but another still larger one in the sculpture gallery in the rear of the building. This weeding out must, we fear, have been attended with grief to a good many people, but we cannot blame the Academy in this respect, however we might be disposed to blame them for some others of their rejections. The state of sculpture is so prosaic at present, the production of mere common-place likenesses of common-place people is something so far apart from the true ends and powers of the art, that some check on the wholesale exhibition of this class of work really seems called for.

One of the best works in the Academy this year is, nevertheless, a portrait statue, that of "the late Rajah Kali Krishna Bahadur" (1,573), by Mr. G. Simonds. This is a curious, and, perhaps, unexpected pendant to the last large work by the same sculptor that was in the Academy, the "Dionysus"; but though this cannot, of course, reach the interest of an ideal subject, it is a statue of no common order, as all must have admitted who saw the original marble under the admirable lighting and arrangement which gave it such effect in the sculptor's studio. The original being due in India, the work is only represented by a cast at the Academy. The Rajah is represented seated, dressed in long robes, which are treated in a fine sculpturesque style; the countenance is meditative in expression, the attitude that of dignified repose. This will, no doubt, take rank as one of the best English portrait statues of late years; it must, in fairness to others, however, be admitted that its author has had an immense advantage in the Oriental dress, which is so suitable for the sculptor's purpose, and that no sculptor who has been tied down to every-day English costume in a portrait statue can be said to be fairly represented for comparison with an Oriental one. This is emphatically shown in the two colossal statues of the late Sir Rowland Hill, by Mr. Brock (1,546), and Mr. Onslow Ford (1,556), each representing the patron saint of the Post-office in a frock-coat. Mr. Brock's is the best work of the two; he has obviously aimed at giving as much ease and grace of line to the figure as the difficulties of the costume will allow him, and when seen in a more unconfined manner in the open air it will, we believe, be adjudged to be more successful than the average of portrait statues in European dress; but it is a rather sad sight for all that.

Mr. G. A. Lawson's "Automate" (1,696), is a cast of a life-size heavily draped female figure, which, we presume, represents one of the Danaïdes. She carries under her left arm a large jar, her head and the upper part of her figure being drawn towards the right in the effort to sustain the weight; the face is turned partly upwards, and eyebrows raised with an expression of weariness and hopelessness. The drapery falls in long folds crossing the figure in the direction of its strain, and adding to the look of drag of the whole. This is a very fine work, and we should be glad to see it another year in marble. Mr. Thornycroft's "Teucer" is re-exhibited in consequence of its purchase by the Academy; we spoke of it last year. It is a figure that gains on further acquaintance, and we like it better this year than formerly. Both this and Mr. Lawson's figure may be cited as examples of sculpture which represent the best and highest use of sculpture,—the representation of a moment of impressive action in an ideal figure, from which every realistic association is removed. Each of them is a thought fixed in plastic form; no imitation of any figure of real life (that is the office, or one office, of painting), but an abstract ideal brought into visible form. It is unfortunate that there is so little in English sculpture to come under this category, though no doubt it is partly the fault of the public, who do not seem to want ideal sculpture, or to understand it when they get it. Some sculptors might be glad to give their minds to the ideal, and do so with success, who are forced to gain bread by the production of the real. This applies, no doubt, to every branch of high-class art, but it seems to be peculiarly the case with sculpture, where the disproportion between the artist's aspiration and his opportunities seems to be greater than in any other art.

Among the subjects ranged round the central Hall we notice one or two works which belong to the class of imaginative art, though it can hardly be said that any of them are of high importance. Mr. A. G. Atkinson's "Stephen the Martyr" (1,548) is an attempt to illustrate that most pathetic incident in the Acts of the Apostles, the last words of the martyr to Jewish bigotry as he kneeled down amid the shower of stones, and prayed for those who were murdering him. It is a noble subject, and the sculptor has shown true feeling at least in his treatment of it. The figure is nude, kneeling with his hands bound behind him, the face upturned, with an expression of pain and of just failing consciousness. The figure is thus a sad one to look at, and hardly rises to the height of the subject. If the artist could have realised the expression of happiness in a beatific vision (which the reader will remember is included in the Bible narrative), struggling with but overcoming the expression of physical suffering, he would have done a higher, we may also add a much more difficult, task. As it is, he has represented the pain rather than the triumph of the martyr's death; but we are, nevertheless, grateful to any sculptor who gives his mind to work of this stamp. Mr. S. Fry exhibits a work also of ideal class, "There is no Way but this" (1,544), a terra-cotta half-length figure of a woman unsheathing a dagger, with the intention evidently of using it against her own life. Half-length is an awkward method in sculpture; the figure looks as if it were a portion of a statue of which the lower half is missing, and the face is rather coarsely modelled, and not very expressive of the situation, but there is an idea in the work. The "Lancashire Witch" (1,571), by Mr. Percival Ball, is a highly-finished and gracefully-modelled marble figure of a nude woman breaking a sword across her knee; we cannot profess sufficient recollection of the story of the Lancashire Witch to enter precisely into the meaning of the action and of the accessories; it may be partly on this account that we cannot find the work very interesting.

In the lecture-room "The Kiss of Victory" (1,597) by Mr. A. Gilbert, a group of two figures about one-third the size of life, embodies a fine idea, falling short through want of power and style in execution. It represents a naked warrior, who may be supposed to have been just victorious in a combat, throwing his head back to receive the kiss of a winged figure of Victory behind him. This is a splendid *motif* for a group, but the sculptor has not realised it; it is tame, deficient in energy and intensity. Mr. Milo Griffith's "The Ancient Woodman" (1,598), is by no means deficient in vigour of action; this is a life-size terra-cotta representing, we presume, the Man of the "Stone Age," for he has a hatchet with apparently a stone head, with which he has cleft the trunk of a tree, and driven wedges into it, and is now finally rending it apart with his hands. But the face has far too much of the expression of the modern man, though a rough one, than of what we might suppose to be the physiognomy of the incboate man of a long-past epoch. If the sculptor could have reproduced *that* man for us he would have done something really poetic, though in a *bizarre* way; as it is, his work can only have the praise of being spirited as a figure. Mr. F.

Calcott's figure of a mother and child, "A Mother's Love" (1,620), owes its origination to Dalou, and certainly does not reproduce the peculiar *finesse* which the distinguished French sculptor is able to impart to figures taken from rustic life; but it is a very pleasing group. How the honours are divided between Mr. Pepys Cockerell and Signor A. Fabbrucci, who own the joint authorship of the "St. George and the Dragon" (1,624), we do not ascertain; did one model the knight and the other clothe him in armour, or did one design the knight and the other the dragon? The statue is what may be called an adequate representation of a young man in armour with one foot on the head of what the Germans call a "wurm"; but of any great ideal of St. George the group is quite innocent. There is a pretty rustic figure by Mr. Kummer, called "Aschenbrödel" (1,664), and a clever figure by Mr. Armstead, called "Ariel" (1,680), and characteristic enough of Ariel in the doubled-up attitude, as if watching for commands, and in the thin lithe limbs; but there is nothing of Ariel in the face, which is much too old and too tame, and even sad in expression, for Shakspeare's gay and fanciful child of the elements. A small figure of "Undine" rising out of the well (1,633), by Miss Walters, wringing her hands above her head, as described in Fouqué's wild tale, shows real poetic feeling and pathos.

In the Central Hall every one who passes is brought up by two little terra-cotta figures, by Signor L. Fabbrucci, entitled "Waiting for Mamma" (1,576), two small children, whose efforts at patience are gradually giving way to uneasiness and a little tendency to pouting. This is a most charming realisation of childish manner and nature, one of the most successful things of the kind that we have seen, and it is quite amusing to sit near it and watch the smile of pleasure and interest which it calls up in the face of every one who pauses before it: it is "the one touch of nature" very happily illustrated. "A Waif" (1,564), a single terra-cotta figure of a street Arab, by Signor Lucchesi, which is placed as a *vis-à vis* to the last-named work, is also successful in its way, and rather pathetic in the expression of the face. Among the larger portrait-works here one of the most important is Mr. Boehm's statue of Lord Lawrence (1,566), to be placed in bronze in Waterloo-place. Mr. Boehm's work will, at any rate, be a contrast in manner and feeling to one or two very tame portrait-statues which now occupy that site. His figure represents Lord Lawrence in the act of propounding to an assembly of Hindus the question, "Will you be governed by the pen or by the sword?" the two implements of sway being held in either hand with an action appropriate to the words; but in accordance with what was the real wish, no doubt, of the speaker, the sword is kept rather in the background, the pen held forth more freely. Lord Lawrence is represented in the rather *dégagé* costume which the climate he was in rendered necessary: the action of the figure, the head thrown back and the body thrown forward, is certainly not elegant, and we should say is exaggerated, even as the expression of a moment of eager and decisive appeal in the middle of a speech; but, in spite of this, the statue has, at all events, the merit of being characteristic and forcible in manner and expression, and not cut out on the regulation type of our public statues. We did not allude to Mr. Boehm's fine statue of Carlyle seated, of which the marble edition is in this exhibition, because in its terra-cotta form it was previously exhibited, and was the subject of much attention. A bronze replica of it is to be placed "on the Thames embankment"; we presume on the Chelsea Embankment, near the spot where Carlyle lived, and where his figure was familiar. It will be one of the best records of a distinguished man of the time which contemporary sculpture has produced. A small model of Mr. Bruce Joy's statue of Mr. Gladstone, for East London, is in the Lecture Room, and in this form, as in the case of the full-sized model when we saw it elsewhere, impresses us as an admirable work, a good likeness, and fine and impressive in action. Several portraits by Mr. H. R. Pinker show that this gentleman, with whose name we are not familiar, is destined to take a very good place among our portrait sculptors at least. His bust of the "Postmaster-General" (1,627) is admirable, and almost equally so is the execution of the fine, keen head of the late Professor Rolleston, to be executed in marble for the University Museum at Oxford. Mr. Woolner's life-size medallion of the head of the late Mr. Jas. Spedding (1,637), also a University Commission, to be placed in the ante-chapel at Trinity College, Cambridge, is a most delicately-executed piece of modelling, and is a form of portrait sculpture which, on some grounds, is preferable to a bust in the round: it enables the sculptor to escape from details which are sometimes at variance with sculptural effect, and to give a more abstract and ideal treatment to the work. There are some good bust portraits, however, among which we may particularise Mr. Bruce Joy's portrait of "Mr. Hermann Vezin" (1,560),—a bust almost Roman in its dignity. Among works of another class we would point out the statuette, "Friend or Foe" (1,629), by R. le Grand Johnston and R. J. Fennessy. It represents a camel and his driver passing through the desert, both admirably modelled, and evidently from the life.

The Lecture-room is unquestionably a great improvement on the old sculpture gallery, for sculpture, but before another year's exhibition it should be rendered a little more warm and attractive in effect by decoration and drapery. We have often pointed out that to place sculpture in the only nearly colourless room in the building is to place it under a disadvantage in regard to the general effect on the eye, which feels the sculpture to be so very cold after going over a number of pictures full of colour and hung on a highly-coloured ground. The sculptures rather gain than lose in individual effect by association with colour. We should suggest also that some few of the more important pictures might very well be grouped on the walls of the Lecture-room in combination with draperies; an arrangement which would conduce to the good effect of the Sculpture-room, and might set off pictures on a large scale and in a powerful style to exceptional advantage, while leaving some extra space clear on other walls for works which would otherwise have to be rejected.

THE INTERNATIONAL EXHIBITION OF PAINTING IN PARIS.

THE International Fine-Art Exhibition, the first of a series now being held in Paris, in M. Petit's handsome rooms in the Rue de Sèze, near the Madeleine, promises to mark what may be fairly termed a new departure in the well-sustained history of French art. It may really be regarded as what the Germans would call an epoch-making innovation, when a strictly limited selection of the painters of England, of France, of Italy, Spain, Belgium, Russia, Germany, Austria, Sweden, and Holland, have agreed, at the invitation of a committee of three artists, to contribute their works for exhibition and comparison. When Mr. Millais and Mr. Alma-Tadema contribute each several pictures to represent England; Gerôme, Baudry, and Jules Dupré, to represent France; De Nittis, Italy; Madrazo, Spain; Alfred Stevens, Belgium; M. Bogoloboff and M. Pokitonow, Russia; Knaus and Menzel, Germany; Charlemont, Austria; Wahlberg, Sweden; and Josef Israels, Holland,—a selection of these works may fairly be said to constitute a display of ability such as has not been seen at any other previous period of history. Not but that there have been similar gatherings of pictures in former years, such as was seen in Hyde Park, in 1851; in Paris, in 1867 and 1878; and in other great exhibitions. Yet, on all these occasions, the masters of modern art have been so overwhelmed by the work of the less distinguished men, that the critical world has been unable fairly to arrive at an estimate of the real value of the best and the valuelessness of the mass.

It is not until we see, as we occasionally have the rare opportunity of doing, a selection of pictures where every canvas or panel is a real masterpiece, that we can form a correct judgment of the vast importance of the factor in civilisation that is supplied by art. It is not until we have visited again and again exhibitions of well-selected pictures that we experience the feeling of being really refreshed by art, instead of suffering the terrible sensation of fatigue that is caused invariably by a visit to such shows as we now so often have brought before us, large gatherings of pictures indiscriminately selected and injudiciously, if not thoughtlessly, placed in careless juxtaposition, the bad with worse, and the worst apparently everywhere.

It is impossible to visit the great exhibitions of the day, the Paris *Salon*, the Royal Academy, and the Grosvenor, without feeling that the time has surely arrived when something like a new departure should be adventured on, and just such a one as that which, with the aid of M. Petit and MM. De Nittis, Madrazo, and Alfred Stevens, has now for the first time been made in Paris. How much we would like to see in London a similar attempt; if not an international exhibition such as the Parisians have imagined in order to counterbalance the weariness and commonplace character of their *Salon* (where more than 6,000 works of art are now being exhibited), an exhibition like that at the rooms of M. Petit, consisting of not more than eighty or so pictures, a selection of works of art chosen without prejudice and representing some special phase either of English or perhaps foreign art. An exhibition not a rival of the Parisian venture, not a business speculation, not even the enterprise of a generous worker like Sir Coutts-Lindsay,—whose kindness of heart causes him occasionally to relax his severe standard by admitting works of friends or of painters admired by a large section of the public,—but the selection of only a few, a very few, acknowledged great English painters, themselves independent of pecuniary gain, and anxious alone to promote a love of true art. Such an exhibition as by this means would be brought together would surely do much to create a correct knowledge of what is understood to be right, at least by a select few of the leading artists. By this means we should perhaps arrive at something like a standard by which the rising generation, of whom so many are now in pursuit of art, might be guided, and not, as is the case at present, bewildered by the variety of utterly adverse styles of art which are to be seen apparently done equal honour to at our exhibitions.

Unless some new direction is taken in the arrangement of our modern picture-shows they will indeed become the "bores" that they are too often accused of being; but classified as we hope some day to see them, and exhibitions of *genre*, of landscape and the other branches organised, they may again take the place that they are in reality intended to hold, as instructive schools to the professional and critical student, and pleasing exhibitions to the outside public,—not the mere commercial show-places into which they have been heedlessly, we are inclined to think, allowed to slope.

THE GREAT DIAMONDS OF THE WORLD.

THERE is something extraordinary in the fascination which the largest and most valuable specimens of the diamond have exercised over mankind. In the preface to the book* in which he has examined the history of the most important diamonds known to the world, Mr. Streeter observes that the diamond has been of no less influence in the East than the very gods whose temples it has adorned. "It has been a factor in tragedies innumerable, supplying the motives of war and rapine, setting father against son, blurring the fair image of virtue, making life a curse where it had been a blessing, and adding new terrors to death. There is no intrigue however deep, no crime however shameful, which you cannot parallel in the history of famous gems." And this absolute rage for the possession of one of these shining bits of carbon does not seem to have been, in the East at least, of the nature of that "*auri sacra fames*," that accursed hunger for wealth, which has been the more comprehensible motive for many crimes. The Eastern potentates, who were ready to commit any crime to secure a famous diamond, do not appear to have coveted it for the sake of the money value which it represented, but for the mere glory of possession. One conclusion we may draw is, perhaps, that the habit of mind which would attach such special value to what is after all only a splendid gewgaw, is essentially a barbaric one, and that with advancing culture the money value of property of this kind, which is merely the measure of the desire of people to possess it, is likely steadily to diminish; though those who deal in this class of merchandise at present may console themselves with the reflection that the demand for it will last their time, at any rate.

* The Great Diamonds of the World, their History and Romance; collected from official, private, and other sources, during many years of correspondence and inquiry. By Edwin W. Streeter, F.R.G.S., &c. Edited and annotated by Joseph Hatton and A. H. Keane. London: G. Bell & Sons (no date).

The diamonds of sufficient importance to have a place in Mr. Streeter's pages are between seventy and eighty in number, to nearly all of which a separate chapter is devoted. Of these, some few much surpass the rest in size and value; but the reputed largest one, the Braganza, which, if genuine, would be priced, according to current usage, at many millions, is regarded by the author as of worse than doubtful reputation. The largest of which the repute as genuine is tolerably established, is the Matan, belonging to the Sultan of Borneo; and even in this case it seems to be doubtful who has seen it and who has not, as it is more than supposed that in a majority of cases only a model of it has been exhibited to strangers who have obtained, as they supposed, permission to see it. There seems to be a curious mystery hanging about others of the reputed great diamonds; the Great Mogul, the history of which goes a considerable way back, having altogether disappeared, while it is supposed by some to be identical with the Kohinûr. Mr. Streeter, however, is convinced that they were separate stones, and that the Mogul was probably stolen from Delhi, where it was last heard of towards the end of the last century, and probably split into smaller stones. This, also, Mr. Streeter believes to be the case with what was known as the "Tavernier blue diamond," which was purchased from the eminent diamond-merchant and expert, Tavernier, by Louis XIV., for 100,000*l.*, and was stolen from the Garde Meuble, whither the Crown regalia had been transferred, in 1792, and never seen again in its original form. This was a splendid blue diamond, of so unique a character that its sale would have been difficult to effect without detection; but as in 1839 there appeared in the market a blue diamond of similar character but smaller size, without any history, the conclusion that they are the same seems probable. Mr. Streeter gives a diagram showing the difference in shape between the "Hope blue" and the described shape of the Tavernier diamond, and how a piece might have been split off from it so as to alter its character and shape materially. The history of the Kohinûr, the finest, though not largest, of diamonds, and the one with the most romantic story, is very fully written; and this and other chapters of the book contain a good deal of interesting matter, and the volume is useful also as a body of information on a curious subject.

The author remarks on the fact that none of the great diamonds have yet found their way to the American Republic. It may be observed that Republics generally (unless we call Venice a republic, which it was, however, only in name) do not develope the taste for costly toys of this kind nearly so much as monarchies. Mr. Streeter, however, thinks the diamond taste will have its day presently among the Americans, among whom the wealthy class have already developed so great a taste for luxury, and that the future of some of the great diamonds will be to pass into the hand of American millionaires in exchange for money which may be of more value to some of the present owners than the mere *éclat* of possessing this or that diamond; and his surmise is not an improbable one.

PICTURES AT THE ROYAL ALBERT HALL.

As last year, so also this year, a considerable number of pictures which would have been hung at the Academy but for want of room, have found opportunity for exhibition on the walls of the gallery at the Albert Hall. Among them are some good works, including several which might very well have gained a place in the Academy instead of some that are hung there. Sir Robert Collier's "Rosenlani" is a fine, solidly-painted Swiss landscape, every part of which is conscientiously worked out, with no tricks of effect. Two sea-pictures, by Mr. H. Musgrave, "A Dangerous Coast" and "Mid-Channel" (7, 24), are admirable examples of sea painting, if we except a little bit of trickiness in the effect of sunlight on the near water, in the last-named of the two; but had these been well hung at the Academy they would have unquestionably attracted admiration, and we hope they will do so in their present position. Among others of the pictures sent under these conditions may be mentioned Mr. W. Sidney Cooper's "Evening on the Thames" (19), which is a good landscape; Mr. Stevenson's "Evening on the Seine" (6); Mr. Glendonning's "River scene, Sussex" (9), where the water is rather mannered in treatment, but the rest of the painting very good; Mr. Tomson's "Toby" (30), a picture of dogs, in which a performing dog with a collar is criticised by others of his race; Mr. Kennington's "The Sonnet" (52), a bit of old Florentine life; and Mr. Cuthbert Rigby's "Winter" (55), which is apparently a portrait, a three-quarter length of a lady in winter dress, with a decorative background,—a very pleasing work.

Among other works exhibited, which have not been submitted to the judgment of Academicians, is one by Mr. A. B. Donaldson, "Flight from the Danes," exhibiting this painter's usual feeling for tone and colour, and his careful and learned study of archæological costume and accessories. The picture shows a party of nuns and others apparently escaping from a monastery, with as many of the sacred objects, shrines, &c., as they can carry away; their chance of escape is certainly small considering the proximity of the ship-loads of warriors with winged helmets. There is a great deal of expression in some of the figures, and the picture is probably a tolerably truthful recalling of a kind of incident that was very common in the early days of the history of this island. There are some nice bits of painting of less important subjects, and it is agreeable to meet again Mr. Story's very clever picture of the interior of the old Bath pump-room, which was at the Royal Academy some four or five years ago. There is a very clever work by Mr. A. Spring, "The Forester's Boy" (84). There are also some good architectural drawings, and among the miscellaneous collection of drawings and designs of various kinds is one of the very finest of Mr. Seymour Haden's etchings.

THOUGHTS ON MANY THINGS.

BY W. PETTIT GRIFFITH, F.S.A.

"The eternal laws of nature
Can't be reversed by human creature;
And what's immutable in frame
Will through all ages run the same:
Truth will be truth, and error error,
In spite of sophistry or terror;
And no smooth magic of the tongue,
Can change the modes of right or wrong."
Oxford, 1729.

HAVING before directed attention to the fact, that it was universally believed by the ancient philosophers that insects were spontaneously generated from putrefying substances,—an opinion now only maintained by uninformed persons,—and that we have no spontaneous creations of architecture, the importance of agreeing upon a standard of proportion and taste is self-evident. There is one grave reason in favour of creating a fixed standard for form and taste, viz., that the creation of the world was not spontaneous; and that the present animals, although their anatomical construction is eminently based upon utility, have in proportion and form undergone remarkable changes. The earliest remains discovered by the geologist, although as far as utility is concerned they were good, and answered the purposes for which they were created, still they were of huge and uncomely forms, and of colossal dimensions; but now are represented by animals of comparatively inferior size and strength, although matured and more harmonious.

As perfection is but of slow growth, it has taken many thousand years to produce the perfected man, the animals, and the flowers. Such is the unity of nature, that it is difficult to determine where animal life begins and plant life leaves off. Also, to discern where reason commences and instinct ends; the human mind, which is instinct perfected, being the most marvellous.

There is no doubt that man, as well as other animals, was originally of an uncouth and colossal form, and in likeness resembled a gorilla more than the perfected man. Hence the uselessness of the geologist endeavouring to discover in the primitive rocks the skeleton or the petrified remains of the perfected race of man. The most polished nations that ever existed were originally barbarians, notwithstanding the fictions of Homer and Virgil.

The art kingdom has been, and is, passing through a similar evolution to that which Nature has been, and is still, undergoing; and from a simple beginning most beautiful and endless forms and colours have been and are being evolved. Such an operation, always in progress in the past and the present, is destined to continue indefinitely.

In contemplating Nature's works,—the works of the creation,—one universal system should be attained. System is good, therefore all variety must be gathered into unity. If it be good on the small scale, it will be truer on the largest scale, including all elements. To treat of things detached and piecemeal, without connexion or proportion, must be radically and fundamentally erroneous.

To judge of the precise proportion awarded to the first man, and to each of all other forms at the creation, is difficult, unless the golden mean be appealed to for a decision; and as far as living objects are concerned, a tolerably correct conclusion may by this mean be obtained. To apply a mean to art-objects is absurd; buildings and their component parts are separately created.

Science by deduction demonstrates Nature's principles and indisputable laws. The study of science

"Is but to hold
Converse with nature's charms, and view her stores unroll'd."—*Byron.*

Art perfects nature, "art being nature better understood." The knowledge of external nature was originally derived from observation; observation being the mother of natural philosophy. Bacon maintained that no philosophical truth or general principle could be obtained by any other method than by the induction of facts, or was entitled to acceptance, except in so far as it was supported by that testimony. The fundamental tenet, in short, of philosophy is announced in the opening sentence of the *Novum Organon*,—"Man, the servant and interpreter of Nature, understands and reduces to practice just so much as he has actually experienced of Nature's laws; more he can neither know nor achieve." The imitative arts have been considered in two points of view,—(1), imitations of such objects as are actually before the eye; (2), representations of those images which are formed by the fancy. The first is the mechanic or executive part of the art; the second, the ideal or inventive. Tully has justly distinguished those parts, when he observes that the Jupiter of Phidias was not drawn from any pattern in nature, but from that idea of unexampled beauty which the artist had formed in his mind. The perfection of the art consists in the union of these two parts; it is, in fact, nature methodised and made perfect.

The creation of a Government Department of the Fine Arts to classify and preserve historical monuments is feasible and practicable; but without a standard of taste, defining the good from the bad, the beautiful from ugliness, no Minister of Arts could exercise any authority. There is, however, one controlling influence (as set forth in the *Builder*, vol. xxxviii., p. 801), viz., to educate the people. The human mind can be taught, but cannot be enchained; we must,—

"Wait for the dawning of a brighter day,
And snap the chain the moment when you may,
Nature imprints upon whate'er we see
That has a heart and life in it, Be free!"—*Cowper.*

Nature is more constant than fashion, and good painters never care for drawing people in the fashion, well knowing that the prevailing costume, although it may impart a grace to their present portraitures, will make a very odd figure in the eyes of posterity; hence the inducement for representing an illustrious person in a Roman habit, or in some other dress that never varies,—

"Veil'd in a simple robe, their best attire,
Beyond the pomp of dress; for loveliness
Needs not the foreign aid of ornament,
But is, when unadorn'd adorn'd the most."
Thomson.

The beautiful Mediæval architecture is not to be repudiated because religion loaded it with ignorant superstitions, neither known to reason nor recognised by the early Christians. The past can be improved upon without being annihilated,—

"Can man do more than with nice skill,
With firm and conscientious will,
Practise the art transmitted from the past?"
Goethe.

Valuable as the British Museum is, as a receptacle and storehouse for all intelligence and the fine-art products of the world, it fails as an educational medium. The regulation, as far as regards the reading-room, that "no person under twenty-one years of age shall be admissible, except under a special order of the trustees," should be modified, as it may be

fairly allowed that the education of most young men is completed at the age of twenty-one years. Another abuse is, that persons under that age may be admitted by a special order from the trustees. If the British Museum be a national institution, which it is, the laws ought to extend to all persons, without private privileges. Eighteen years should be substituted for twenty-one years for admission to the reading-room, and special orders dispensed with.

The art of man, if not tutored by science according to the infallible rule of truth, is apt to run into excess and impropriety; and while it affects to be too fine and too powerful, becomes ridiculous. It is asserted that Queen Elizabeth took care by her injunctions that affectation, which spoils all other things, should not be permitted to spoil ecclesiastical music; and it has been observed that the music from the Reformation to the Restoration was more plain and solemn in its style than that which succeeded.

Nature teaches us to combine utility with ornament,—that which is beneficial as well as entertaining,—so as to mingle, in the constitution of things, what is pleasing to our imagination with what is serviceable to our interests. In all art-products a perpetual similarity of objects creates a cold disgust, as Shakespeare says,—

"Sweets grown common lose their dear delight."

Scientific analysts, guided by Nature and reason, can alone eliminate lasting truth. The true mark and proof of the certainty of any fact is the uniform agreement of all those who have written thereupon. In short, if we pursue reason and leave imagination, we shall then embody our thoughts and fix our opinions upon solid principles, as—

"Each rising art by just gradation moves,
Toil builds on toil, and age on age improves."
Collins.

We have been greatly indebted to manuscripts and medals for historical knowledge, more so than to some of the clergy, who in past times caused the destruction of many interesting monuments. In a copy of Willis's "History of the Cathedrals of Lincoln, Ely, &c.," sold among Dr. Stukeley's books, 1765, was this note, quoted in the *Gentleman's Magazine*, 1802:—"In the beginning of 1753 the wicked chanter Dr. Trimnell, of his own authority, pulled down the eleven fine images of kings over the west door of Lincoln Cathedral to put up a foolish inscription of the names of the subscribers to the new iron rails."

The same was said of a dean of Lichfield, that, being whimsical or deranged, he fancied the kings who in two rows graced the west front of that cathedral would some time or other tumble on his head as he went in and out, and employed a chimney-sweeper's boy, at great hazard, to pull them down.

In 1804, intellectual inquiries calculated to shed a light upon and confirm history were often denounced. In "Rural Philosophy, or Reflections of Knowledge," the author says:—"We sometimes meet with men, under the title of antiquarians, who rate things more by the character of age with which they are impressed, than by their real value; and who place their chief delight in the collection of old manuscripts or old medals, or other fragments of old time, which have nothing to recommend them but their rust and rarity."

A morbid taste may be acquired for ancient relics, neither useful nor ornamental, and to which, no doubt, Johnson alluded when he said, as recorded by Boswell, that "a mere antiquarian is a rugged being."

Archæology is of great assistance and importance to the architect: consequently to raise a smile at its expense, especially from students, is indefensible. The late respected Sydney Smirke, in his lectures at the Royal Academy, however, could not resist the temptation, when he said, "Utterly discard from your minds the bigotry of a mere antiquarian"; "but, above all, let us not be content to rattle the dry bones of antiquity, and fancy that it is music."

In the "Surrey Archæological Society's Collections," vol. v., credit is given to the Rector of Chaldon Church, Surrey, for preserving a large painting. It is stated that, "instead of leaving, as is too commonly the case, everything to the architect and his clerk of the works, he kept a watchful eye upon the proceedings, and catching sight of some colour peeping out beneath the whitewash, warned those employed in removing the latter, and thus preserved the painting." The importance of archæology is in this instance verified.

The laudable endeavours to expand the intellect of the Welsh people are even now frustrated by Puritanical attempts to ignore history and science. Huxley, Darwin, and Tyndall are looked upon with pious horror. It is not surprising, then, to find that, except in a few cases, science is not cultivated in Wales. The little demand for the arts of sculpture and painting is easily accounted for; such works bear a suspicious resemblance to the graving of images, and making the likeness of things which are in heaven above, in the earth beneath, or in the water under the earth. The superstitions of the ancient Britons, and their ignorance, have not yet been eradicated; although the habit of borrowing money of the people with a promise to pay in the next world, is not now credited.

It has been asserted that the "Druidical temples in Britain, while they bear the most indubitable marks of patriarchal antiquity, are so stupendous that a single stone appears a ruin; the design is so grand and magnificent, that the projectors must have been of the first-rate class of architects." The absurdity of the above is self-evident. The so-called Druidical temples, so long as they exist, afford specimens of the works of untutored savages or barbarians. The custom of carrying about, three weeks after Christmas, a small chest in imitation of Noah's ark, inhabited by a live wren, to remind the present generation that they are descended from Noah, is equally barbarous, although admirably commemorative of Noah's intemperance (see Genesis ix. 21), which example the inhabitants of Wales have studiously followed.

The religion of the ancient Britons has been the cause of the degradation of Wales. It may be easily supposed that the manners of the people took a tincture from the discipline of their teachers. True education is a development of faculties according to individual capacity and character. Amongst working people, the want of better means of recreation, and especially on Sundays, is an obvious disadvantage. How often a young woman with a taste for art, for books, or for music, marries a man who has no taste for anything but the public-house after his work is done. We have at last, however, prospects of a new era, education now being in the hands of the laity. The clergy, as a body, have always dreaded the march of knowledge, and viewed the progress of the human understanding with a jaundiced eye.

Thanks to the Legislature, we are provided with a Building Act, and, indifferent as it may be, it prevents many irregularities which the building world would undoubtedly perpetrate; and if a stringent Act of Parliament could be framed, regulating the building of new churches, and the restorations and alterations of our cathedrals and churches, it would be advantageous. It is true that rural deans have the power of inspecting churches within their own deanery, and of ascertaining necessary repairs, and recommending the same to the churchwardens; but rural deans have seldom that practical knowledge of ecclesiastical architecture which is requisite, and, moreover, they are greatly influenced by the clergy, who, generally speaking, have no practical, and very little other, knowledge of architecture, and often permit their sons, in combination with the country mason, to effect spoliations. Numerous instances could be named of so-called restorations displaying ignorance and appearing ridiculous to an educated eye. Where the ornamentation and mouldings have been defaced and mutilated, either by neglect or time, the proper method to restore is to seek examples of ornament and mouldings existing in buildings of the period analogous to the edifice to be restored, and this can only be done by an educated architect.

To remedy these evils an Act of Parliament enacting that rural deans shall require the diocesan church architects, or educated practical architects, to make surveys, and advise accordingly, should be provided; and further, that no clergyman or other person shall alter or add to any ecclesiastical edifice without the supervision of an experienced architect on behalf of the rural dean. We are often indebted to the clergy for raising funds for building new churches, and effecting restorations to old ones, and there is no doubt, upon reflection, that the clergy would not object to the realisation of this suggestion. No church, also, ought to be built without a lightning-conductor; in all cases *science* demands this. In many village churches, instead of putting the conventional cock on the spire, well known to the church architect, a large, fat, spurred, and gilt domestic fowl is mounted, conveying to the mind an adjacent farmyard.

The highest aim of science is mere truth, which shines always the brighter for being opposed. Science and art show that in nature beauty and utility are combined in such unity as proves their source in one supreme mind,—creating, adjusting, and adorning. The shortest road in every art is that which leads through theory to practice. It is from theory that arises that great facility, by means of which a man advances the quicker, in proportion as he is surer of not taking a wrong step; whilst those who are not grounded in the science labour on in perpetual doubt.

Poetry has been considered a luxury; there is no doubt that two or three lines of poetry may convey to the mind a readier explanation than a page of prose. Still a philosopher would consent to lose a poet to regain an historian, for some future poet may arise to supply the vacant place of a lost poet, but it is not so with the historian. Fancy may be supplied; but facts once lost in the annals of mankind leave a chasm never to be filled.

Disraeli, in alluding to the pleasures derivable from the cultivation of the arts, sciences, and literature, says that time will not abate the growing passion; for old men will cherish an affection and feel a youthful enthusiasm in those pursuits, when all others have ceased to interest. Socrates learned to play on musical instruments in his old age; Cato, at eighty, thought proper to learn Greek; and Plutarch, almost as late in his life, Latin. Theophrastus began his work on the "Characters of Men" at ninety. Colbert, the famous French minister, at sixty, returned to his Latin and law studies. Ludovico Monaldesco, at one hundred and fifteen, wrote the memories of his times. Michelangelo preserved his creative genius in extreme old age; and there are many other instances. Dr. Johnson, when in his seventieth year, said it is from want of use, if a man's mind grows torpid in his old age.

Seneca says, "whatever be the amusements you choose, return not slowly from those of the body to the mind; exercise the latter night and day. The mind is nourished at a cheap rate; neither cold nor heat, nor age itself, can interrupt this exercise; give therefore all your cares to a possession which ameliorates even in its old age."

Books have been considered as the nourishment of the soul, or, according to Diodorus, the medicine of the mind. A student has in his books "the ruins of an antique world, and the glories of a modern one." Johnson said that a man's mind grows narrow in a narrow place, whose mind is enlarged only because he has lived in a large place; but what is got by books and thinking, is preserved in a narrow place as well as in a large place.

Analytical writers have divided genius into two kinds. The one belongs to the sciences, the other to the arts; the one is employed in the discovery of truth, the other in the production of beauty; the one addresses its discoveries to the understanding, the other its productions to the taste. Beauty has been defined as

"Heaven's most beauteous gift esteem'd."

But more concisely expressed by Shakspeare in "Twelfth Night,"—

"Beauty's a flower."

When the mind of an architect or other artist is stored with knowledge and teeming with imagery, he designs very rapidly, otherwise he will have to turn over half a library to make one design.

Some writers on Natural History have expressed astonishment at the rarity of finding a dead bird, and wonder what can become of the immense numbers that must necessarily die, and fall to the ground. Nature does not permit the air we breathe or the water we drink to be long poisoned or polluted, and it would not only afford amusement, but impart great instruction to all sanitary boards to study nature's efforts to purify the air and water. The fact is, as has been before observed, certain insects perform the office of undertaker; attracted by the smell of the corrupting corpse, they hasten to the spot, creep beneath the body, and excavate a vault beneath it; and in this manner the lifeless remains disappear from the surface of the earth, until they are fairly buried. When the interment ceases, the undertakers regale themselves upon the flesh of the departed.

Nature, again, in a sanitary point of view, converts putrifying vegetable matter into manure. Darwin says the millions of leaves and other vegetable matter dragged by worms underneath the soil, whether passed through their bodies or not, form a splendid natural manure. This is interesting so far as the country is concerned, and proves that nature abhors putrefaction, dirt, and all impurities which destroy animal life; but in crowded cities, man, tutored by science, alone can introduce light, air, cleanliness, and consequently health, without which mind and body cannot possess a perfect development.

An excellent lesson may be derived, in a sanitary point of view, from even the life of an insect. If silkworms be kept in a close room, without ventilation, they will neither thrive nor spin. Hence nature, science, and art must be combined.

If, therefore, insect life cannot be sustained without ventilation, it cannot reasonably be expected that the health and lives of human beings can be otherwise than sacrificed without pure air, pure water, efficient drainage, and ventilation. It has been urged that overcrowded drawing-rooms become, for the time, as malarious as some of the worst abodes of the poor, and our public buildings, such as concert-halls and theatres, are abominably ill-ventilated, and, moreover, draughty.

Learning which tends to usefulness must not be undervalued; and, although the old philosophers were held in great esteem, and human knowledge was considered incapable of reaching higher than Pythagoras, Democritus, Plato, and Aristotle, still Socrates was the wisest of them all, because he reduced philosophy to the simplicity of common life, the most useful of all studies; whereas the speculations of the rest, however ingeniously imagined or agreeably expressed, are little better in reality than mere romances. Goethe, in "Faust," was also of this opinion,—

> "I've now, alas! Philosophy,
> Med'cine and Jurisprudence, too,
> And to my cost, Theology,
> With ardent labour studied through,
> And here I stand, with all my lore,
> Poor fool, no wiser than before."

The contrast between Johnson and Shakspeare, although well known, is very remarkable, and imparts a lesson in the great progress of civilisation. Johnson was a classical scholar at a time when knowledge was limited to the few. Milton and Byron's writings were also influenced by the classic school, and were by no means improved by it. Shakspeare, on the contrary, was Nature's scholar, and imbibed his knowledge almost solely from her works, consequently was free from the artificial, unscientific, and untruthful influences, dictated by the gross superstitions ignorance of former times. Johnson's taste was more sensual than artistic; Boswell, on several occasions, argued this matter with him, and his notes taken in France exhibit an ignorance of architecture when he says, "the cathedral of Noyon is very beautiful, the pillars alternately Gothic and Corinthian."

Johnson expressed his disapprobation of ornamental architecture, such as magnificent columns supporting a portico, or expensive pilasters supporting merely their own capitals, because it consumes labour disproportionate to its utility. His remark that a building is not at all more convenient for being decorated with superfluous carved work is more correct. At home and abroad, in ancient and modern times, it can always be said,—

> "Distinguish'd men of every school and age,
> In due succession, all the mind engage."

Finally, the true golden age is this in which we live, that an Eden may be created here by our own efforts, and that the higher life is not idleness, falsely called independence, which is worshipped by most, but a life of productive industry, wherein plain living can be combined with high thinking; then it will be seen that art, science, and literature, on the rugged journey of life, scatter flowers and overshadow the path of the weary, and refresh the desert with their streams, and that they flourish only in their greatest beauty and perfection on the soil of complete mental and political freedom, realising—

> "Fair creations, to perfection wrought,
> Embodied visions of ascending thought!
> Forms of sublimity! by genius traced,
> In tints that vindicate adorning taste;
> Whose bright originals, to earth unknown,
> Live in the spheres encircling Glory's throne;
> Models of art, to deathless fame consign'd,
> Stamp'd with the high-born majesty of mind."

FROM THE BANKS OF THE SEINE.

It is scarcely, after an absence of a year, that the visitor to Paris can expect to find much change, even in a capital which, within a generation, has seen itself transformed in a fashion which, except in the New World, can hardly be said to have an equal. Whatever may have been the activity of the Second Empire, and the early years of the present Republic, within the last twelve months there have been no radical changes in the map of the French capital,—no new thoroughfare opened, such as the Avenue de l'Opéra and the Boulevard Saint-Germain, or the Boulevard Henri Quatre of a few years since. But there are numerous great works in progress; the building activity has in no measure relaxed; wagon after wagon laden with huge blocks of half-dressed stone, ton after ton of cement, pass daily through the gates of the city, and pay the heavy town dues; forests of scaffolding rise in every quarter, and dust and mortar covered jovial masons crowd at meal-times the innumerable *cabarets* in every direction. The modern exigencies arising from the universal admission of the truth of the proverb, that "Time is money," have overcome even the difficulties which formerly the seasons placed in the way of the builder, and protection against the elements once ensured by glass casings, work progresses as rapidly in the winter as in the summer. Palaces of stone, designed to last practically for eternity,—products of a system of tenure that wots not of short leases,—are rising in every neighbourhood, to accommodate a population which is yearly becoming more able to house itself comfortably, while the great public works keep pace with the activity of private enterprise and of the companies which of late have taken upon themselves to invest their capital in the building of what are understood in Paris as *maisons de rapport*, or, as we should say, "flats," which, from all accounts, our New York cousins have now commenced to build in large numbers, and more recently upon co-operative principles.

Foremost among the public works the Hôtel de Ville is rapidly approaching completion; and, since last we saw it, the building has been almost entirely freed from its scaffolding, and the general design can now be fairly judged. If from certain points of view the chimney-stacks are too prominent, the effect, as a whole, is imposing, and, seen from the Pont Neuf, the new Hôtel de Ville, though only a mere reminiscence of the original sixteenth-century work of the Italian Dominico Boccador, certainly forms, with its white stone pavilions and steep roofs, one of the architectural features of Paris. At the present moment the central *motif* of the clock,—a grandiose design to be surrounded, as in the old Hôtel de Ville, with allegorical figures,—is alone awaiting completion, and within a short time will, from all appearances, be uncovered. But the building, thus far advanced exteriorly, and a large number of the generously-distributed statues in their niches, there remains almost the whole interior to complete, and two years, at least, it is reckoned will elapse before there be any hope of the Paris municipality occupying their new quarters. Rumours have gone forth that, on the celebration this year of the great national *fête* of the 14th of July, a municipal banquet would be given within the building; but those who have seen the condition of the interior of the Hôtel de Ville can hardly believe this will be the case. The flooring is not even laid down, nor the painting commenced; and on the first story only the heavy work is completed. We learn that there are about 500 workmen employed at present, over 100 rough-casters, as many carpenters and joiners, and a large number of stone carvers. Progress is being further assisted by the use in the underground work of the electric light. But no energy will enable the Parisians to open their Hôtel de Ville before 1884. It is no small matter the re-building of so important an edifice, and the nine years that have elapsed since the works were commenced cannot be said to have been ill-employed.

Certainly there is not the same activity observed in the erection of the Hôtel de Ville, as is noticeable in the new Post-office. There, since our last visit, the works have progressed to an extent, considering the size of the building, that is truly astonishing; steam windlasses are whirring in every direction raising huge blocks of stone into their definite places, and now that the sturdy foundations are completely terminated, the upper stories are rising rapidly, and the plan of the whole, even in the midst of an inextricable forest of scaffold-poles and joists, can be more or less traced. We spoke not long since of the general distribution of the building, which will certainly do modern Paris the utmost honour. It is not only the Post-office itself which is rising from the earth, but the whole neighbourhood, and several blocks of stone-built five and six story houses of approved modern type have replaced within a few months the broken-down antiquated gloomy hotels and lodging-houses which have occupied the district since the days, not so long since, when fashion deserted the Place des Victoires. In the Rue Bergère, the conspicuous building of the Comptoir d'Escompte, of which we have already spoken more than once, now forms one of the features of modern Paris, while its neighbour on the Boulevard, the huge central office of the Crédit Lyonnais, not content with its already grandiose premises, is enlarging these by important additions at present buried beneath a network of bewildering scaffolding. The well-known "Magasins du Printemps" (in the Boulevard Haussmann), which, it will be remembered, were burnt down about a year since, are progressing steadily towards completion, the use of the electric light allowing of the employment of double shifts of workmen. It is a characteristic sight to see in the darkness the effect of the brilliant light shining through the maze of scaffold-poles, rafters, and unfinished doors and windows, and the shadows of the workmen flitting about like so many elves.

In the Boulevard Saint Germain the new École de Médecine,—which occupies a site crowded with historic memories: in one of the houses demolished Marat was assassinated by Charlotte Corday, — is steadily progressing towards completion; the rising generation of medical students are indeed to be envied the new home that before long they will occupy, with its well-arranged lecture-rooms, museum, and other requisites to study. Though there has been a talk of enlarging the École des Beaux Arts, no steps have as yet been taken in this direction, nor has anything further been done to isolate, as has been urged, the Bibliothèque Nationale. Near Notre Dame the quay which replaces the site of the historic Hôtel Dieu,—of which, at the time of its demolition, we spoke at some length,—is slowly being completed; in the Rue Rivoli, by the side of the Hôtel Continental, the last gap in the long line of arcades stretching from the Rue du Louvre to the Place de la Concorde has at length been filled up, the site of the ruins of the Foreign Office, burnt during the Commune, being built over.*

At the "West End," the district lying between the Champs Elysées and the Trocadéro is gradually filling up with huge private palaces and tall stone-built five and six story "flats," many of them erected by the insurance companies as excellent investments for their capital. The simpler style of architecture which is now in vogue makes these buildings exceedingly attractive features; throughout the architects have adhered to the general type with which all who know Paris are familiar. With a skill which merits praise, a diversity is insured,—even in the levels of the balconies, and certainly in the design of the *portes-cochères* with which every important house in Paris is provided,—that renders what might seem monotonous, agreeably varied. While the same type is retained in a long line, there is none of that sameness with which at home it is impossible not to find fault, when a new street or road has to be laid out; while of the interior arrangements with which the modern houses in Paris are now provided, it is difficult to speak too highly. The economy of room, the artful planning, the study of the conveniences which we now demand from the architect, and which, till within a generation ago in Paris were so lamentably neglected, merit, we have no hesitation in saying, the closest attention from the professional student. As is the case in the United States, each year marks a further improvement, not only in an artistic and decorative direction, but in the practical consideration of the requirements of modern existence, and that proper thrift which, combined with the due regard to luxury, is so marked a feature of French existence. The houses that are being built now in Paris are not such as the coming

* It is in one of the houses in a quiet little street, No. 6, of the Rue du Mont Thabor, at the back of this new block of buildings, that the refined and romantic poet, Alfred de Musset, died in 1857, a house which the Paris Municipality have within the last few days determined to mark by a commemorative tablet.

generation will find "stuffy," "too small," "old-fashioned," and so on, criticisms which with us are commonly passed on the creations of the last twenty-five years; they are houses intended to last practically for all time; built of solid stone and iron throughout, with foundations that resemble Roman work, on the traditions of which, by the way, they are built by the sturdy Southern workmen. Commercially, also, these investments prove successful, and household property, so far from being a drug in the market, is at a premium. By the judicious division into "flats," not only is every inch of space utilised, —the amount of rent for unoccupied room in England it would be curious to calculate,—but all pockets are accommodated, from the prince who occupies the first floor, above the thrifty *concierge* on the *rez-de-chaussée*,—whose charge it is to open the door at night and keep, not only his or her own neat *loge* bright and clean, but the *porte-cochère* and the yard, with its pretty green plants and bright brass water-cock,—through the intermediate *étages* to the fifth or *cinquième*, with its healthy balcony, where the large family of the modest lodger can enjoy the air and view as a compensation for the sensible distance from earth. But all own in common, from the prince to the fifth-floor *employé*, bank clerk, or civil servant, the *porte-cochère*, through which rolls from the compact stables and coach-house in the yard at the back, the carriage of the "first-floor,"—and for all alike the entrances are kept clean, the lamps bright, the oak staircase well waxed; each in his respective and well-proportioned degree making up the very comfortable rental which *Monsieur le propriétaire*, through his agent, the *concierge*, receives quarterly from his tenants.

ART IN COSTUME.*

COSTUME may be regarded philosophically from two points of view,—that of Health, and that of Art. With the former of these I do not propose to deal, except incidentally: our province is Art. The laudable attention now paid to sanitation might incline one to believe, perhaps, that the branch of the subject which we are about to consider is of inferior importance to the other; but however that may be, there is no doubt that it has the priority in point of age, for costume was introduced not from a care for health, but from a desire for ornament. The tales about savages who appear, shortly after the arrival of the white man, arrayed in all the simplicity of a top-hat and collar, have a foundation in fact, though many rashly suppose that they are only concocted by a feeble humorist. And it is only necessary to remind you that, in our own land, where we now find clothing indispensable to health, there lived, within the most recent times, geologically speaking, and under the same climatic conditions, a race of men who wore no clothing, but nevertheless gratified their love of ornament by a system of tattooing,—it is only necessary to bear this in mind, to realise that, with the savage, love of ornament is a stronger passion than anxiety for health.

That aspect of Costume, therefore, which relates to appearance is not without claims upon the attention of the greatest Philistine, and certainly ought to receive full consideration from us whose chief title to distinction from the rest of the building trade is that we cultivate the Beautiful and are inspired more or less with the spirit of Art.

I could quite sympathise with a plain matter-of-fact man who should come to me and say, "Don't trouble us about appearances; we are quite indifferent as to how we look, so long as we have clothes that will keep us comfortable and preserve our health"; and to such a person I should be inclined to reply, with words of assurance, "My good Philistine, you are not wholly devoid of sense; for, whatever may have been the original motive of clothes, their chief function now is to fulfil the behests of comfort and decency; and the object of a treatise on 'Art in Costume' is to show how comfort and decency may be combined with beauty." The sensible Philistine would then very naturally reply, "Comfort we know, and Decency we know; but what is Beauty? and what,—especially what,—is Art?"

What is Art? Art is much more closely allied to common-sense than is generally supposed, even by architects. There are many plain people who are quite overawed at the sound of the word. "What do we know about art?" say they. "No, let art be to them that understand it." There are not a few, on the other hand, especially in these days of "intensity," who believe that they do know all about art, and exhibit their familiarity in such wonderful ways as to imperil the reputation of their goddess. If all these worthy people would bear in mind how nearly related is art to common-sense, they would cease to treat her with such hopeless respect on the one hand, and such impertinent familiarity on the other. For the purpose of this paper, Art may be briefly described as "Common-sense made beautiful."

To define what Beauty is, is much more difficult. There is no such thing as absolute beauty. Beautiful is a relative term. What is beautiful under some conditions ceases to be so when the conditions are changed. What is beautiful to one person is ugly to another. Nevertheless, within certain limits we find that a majority of tastes agree, and that a broad standard of beauty has been established just as a broad standard of honour or of morals has been. One of the essentials of beauty is fitness, and on this, at any rate, we are competent to form a judgment. In matters of dress, as well as many others, fitness is a sure resting-place. Is everything suitable? Does everything fulfil its purpose? If so, the rest may well be left to the taste of the individual. If not, true beauty is incompatible with failure in these essential elements.

The two main principles, then, upon which all costume ought to be founded are,—(1) Comfort, (2) Beauty. I place comfort before beauty, inasmuch as, paraphrasing the lines of a living poet,—

> "Beauty is a steep that few can climb,
> But comfort is a path that all may tread."

Every one knows when he is comfortable, but every one does not know when he is beautiful. If beauty and comfort clash, it is beauty that must give way; but there is generally a means of attaining both, and the art of costume is to do so.

The object of this paper, I may say at once, is not to insist upon ideals, but to examine and criticise our present style of dress, and to suggest certain alterations which might easily be made; some of these lie in any one's power to carry out, while others would almost necessarily have to await a further ripening of opinion, inasmuch as good taste forbids our making ourselves wilfully conspicuous. It will be necessary to illustrate a number of points by referring to the great store-house of History; but, except by way of illustration, it is not my intention to weary you with historical details.

One of the fundamental rules of architectural art is that the exterior treatment shall indicate the interior arrangement, and an ideal costume would follow the same lines. If, therefore, I were insisting upon an ideal costume I should have to call your attention at the outset to this, that whereas male costume admits the fact that human beings have two legs, female costume conceals it; and I should then have to urge upon your acceptance what an American society designates as a "garmenture of a dual form" instead of the prevailing skirt. That such a garment could be defended on historical grounds, as well as on those of convenience, comfort, and beauty, avails nothing against prejudice. The one sufficient answer to the advocates of this dual form is that women find they can do their work better in skirts. That being so, nothing remains but to see how we may improve the existing dress and leave these ideals to take care of themselves. For it must be remembered that costume is not a matter of conscience, but convenience; and however deeply we are convinced that some other arrangement than the present would benefit mankind and womankind, we need not make martyrs of ourselves, but may without sin bow down (undoubtedly under protest) with the rest of the world to the arch-fiend, Conventionality.

I have called Conventionality an arch-fiend, but I would not maintain that he is so always. Sometimes he is of great assistance to us, and he is certainly inevitable. It is only when he is blindly worshipped that he assumes his devilish guise. He is a good servant, but a bad master; and not only in Costume either. In all relations of life, whether daily, political, or religious, a blind worship of conventionality stifles Thought, and Thought is the breath of the world. If, therefore, in matters of costume we enter into his temple, let us be careful to keep near the door lest the incense numb our faculties.

Let us now turn our attention to the costume of the present day, and see how far it is founded on right principles. Comfort and beauty have been laid down as the two main objects for which we ought to strive. How far do we attain to either of them? In male costume I believe there has never been a time in which, on the whole, comfort and convenience have been so cared for, and there never has been a time in which beauty has been so conspicuously absent. In female costume I cannot pretend seriously to judge either as to comfort or convenience; but from the length of time necessary for the toilette, I should conclude that convenience is not much studied; while from such experience as I have had in wearing petticoats (in connexion with the drama in my youth) I cannot recommend them for comfort; but then I was not brought up to them. In the matter of beauty, ladies have undoubtedly the best of it,—I mean in costume,—and there is no reason why in the present day they should not, with a little care, be as suitably and gracefully dressed as at any period of the world's history. When we look back a few years and remember the chignon, or a few more, and recollect the crinoline, it is really astonishing what strides we have taken in the right direction. What we have to do is to realise in what this improvement consists, and to take care that we plant ourselves so firmly on the solid ground of Art, that the next turn in the wheel of Fashion shall not whisk all our improvements away. Not that we need blindly condemn fashion, and be always "out of it"; but nothing can be feebler than blindly to follow it in defiance of the dictates of common-sense and beauty.

Before bringing our standards of fitness to bear more in detail upon modern dress, it will be necessary to define a little more accurately what we understand by comfort, and to indicate in what particular directions we must seek beauty. By comfort, then, we mean that dress must be useful in all its parts, with no needless and meaningless excrescences; it must allow free play to all the limbs, and to all movements of the body; no part must, by dangling about or otherwise, interfere with the work of the wearer; it must be easy to put off or on, must be adapted to the weather, must be in harmony with all modern requirements, and must be economical. In the search for beauty we must bear in mind that it may consist both in form and colour; the colour will naturally depend upon the taste of the wearer, and cannot be rigorously defined: the form,—and in this we shall find the costume of the present day defective,—the form should be strictly founded upon the figure; that is to say, all the leading lines should have their origin from some exigency of the figure, and not be obviously manufactured. They need not follow the lines of the figure, but they ought to harmonise with them. There is nothing more beautiful than the natural human figure, and therefore to spoil it by tight-lacing, or by high heels or artificial humps, as was the fashion in the days of the departed "bustle," or by any kind of stuffing, padding, or meaningless excrescence, is contrary both to common-sense and art. Another element of beauty, which is too frequently overlooked, is simplicity. Finally, we must always remember that construction may be ornamented, but ornament should never be constructed. This constructing of ornament, this piling-up of decoration for its own sake, in defiance of comfort, has been a very wide-spread evil. Its wildest extravagances have, perhaps, been lavished on the hair, and reached their limit some 150 years ago, when coiffures were so elaborately constructed that they were preserved untouched for three weeks; the foolish martyrs to fashion sleeping meanwhile as best they could.

Having thus obtained a general idea of what we ought to strive after, and what to avoid, let us examine some examples. The first to which I will draw your attention is from a Greek vase, and is given in "Hope's Costume of the Ancients," plate 120. It represents Electra in mourning for Orestes. Here we see some of the essential principles carried out. The under-garment fits close to the figure, while the outer garment derives its folds from the exigencies of its position on the figure. The next two examples are fourteenth-century costumes, and show how it is possible to obtain a beautiful dress without having recourse to flounces and loopings and absurd fringes. They are by no means faultless, especially about the head, but the dresses have the merit of fitting the figure and depending

* A paper by Mr. J. A. Gotch, read before the Architectural Association on the 19th inst.

upon natural causes for their folds. My next example is a specimen of what should be avoided. The whole dress looks like a travesty of costume. The figure is spoilt by its thin waist, is disguised by the fantastic and bunchy dress, which has scarcely a natural fold about it. The hat is absurdly large and overloaded with ornament; the shoes are ridiculously small and high-heeled. Throughout the dress there is no repose, everything is *bizarre* and inartistic, which is not a matter for wonder when we know that the date is 1782. The next is an example of male costume at the close of last century, when we see the first step towards modern trousers. The next three are recent examples from the pages of *Punch*. The man's costume in one of these is hideous, but the others are quite bearable, and one of them is actually graceful. Their beauty springs from the fact that the general outlines of the dresses follow the figure, there is no attempt at distortion, no desire to make the wearers look like either a wine-glass upside down, or a camel; the human figure is considered good enough for the purpose. That is a very important point, and if we can only realise the eternal fitness of it, we shall never be troubled again with crinolines, "Grecian bends," and similar abominations.

The treatment of the hair in one of these pictures from *Punch* is excellent. It is simple, natural, and graceful. The fringe is a matter of taste, as also is the exact finish at the back; but the excellence lies in the way in which the shape of the head is shown, and in the absence of constructed decoration, padding, chignon, and other nasty excrescences. The collar or frill is pleasant, too; and it is worth noting, *en passant*, that a good deal may be expressed by the "lie" of a collar, from the soft, coquettish frill, to the stern, spreading, white collar, suitable only for some of those severe pastimes which pass for business with the fair sex. The details of the dresses are less happy. As a rule, you will find the upper part treated well, the bodice fitted to the figure, and the sleeves sensible; but in the skirt we meet the chief defects which can be charged against modern female costume. All this looping-up and tying-round, all these flounces, and frills, and pleats, and bows, are radically wrong. Why? Because they are unnecessary,—indeed, often inconvenient,—and they are in direct violation of the rule that all the leading lines should spring from some exigency of the figure. Now these do not; they are added from an unruly desire for effect, and the effect obtained is meretricious, it is overdone, it is complex.

Folds in themselves are admirable, are indispensable. The beauty of pictorial costume lies in folds; but the folds must be judicious, and ought to spring from natural causes, and not be heaped up *ad nauseum* by a dressmaker, who wants to cram as much stuff into the dress as she can.

Compare a dress of this kind with that of one of Du Maurier's æsthetic girls. It will be at once evident that, however, in the latter case, the whole figure is overdone in its "intensity," the principle upon which it is draped is correct, and the effect of the folds (not of the *tout ensemble*) is more pleasing than that of the flounces in some of the other examples. The sleeve presents a difficulty. If too loose it gets in the way; if too tight it is uncomfortable. A mixture of the two resulting in great knobs at the shoulders and the elbows is ugly. If the sleeve can be tight from the wrist to the elbow it will display some of the most beautiful curves in the human body, and these curves are still more fascinatingly displayed if circumstances allow a wide, short, and open sleeve. The thinner the stuff of which the sleeves are made, the better do their inevitable wrinkles become, and there is no reason why the sleeves should not be made of thinner stuff than the rest of the dress, if judiciously managed.

There is room for improvement in the finishing of sleeves at the wrist. Frills are all very well, but they are artificial, and are merely stuck on as ornaments, being no integral part of the costume, *e.g.*, in the way that shirt-cuffs are. Facings, whether of velvet or a different kind of cloth, are feeble in conception and poor in effect. A more artistic and reasonable finish would be to turn under the end of the sleeve, which must be done to prevent it fraying, and then, instead of just stitching the two thicknesses together, to work them together with an ornamental pattern, whose variety need only be limited by the invention of the maker.

The subject of bonnets and hats is one to be approached only with the utmost circumspection: for the bonnet is to a lady the focus of her costume,—the very heart of her mystery. It has long been regarded as the most essentially feminine article of her dress, that on which man is incapable of forming any opinion worth the breath expended in uttering it. The fact is, that in this particular matter, feminine taste, or, let us say, dressmaker's taste, is a law unto itself. Anything they choose to decree shall be done. The bonnet is manifestly subject to no known law of nature, therefore, if they will, it shall be a flower-bed, or a bird's-nest, or anything else that is furthest away from the simple notions of barbarous man; it shall protect the chignon in preference to the head, or it shall act as a bridge between the two, and be, do, or suffer, whatever the caprice of the moment may dictate.

I beseech the bonnet-maker to pause and think. Caprice has no place in true art. The laws of art are eternal and immutable, but the method of embodying them may vary as fashion dictates. It is not so much fashion that does harm as the blindness and caprice of fashion. Is not a covering to the head recognised as necessary by all the civilised world? And if you choose to call that covering "bonnet," does that exonerate you from designing a bonnet in a manner most suitable to a covering for the head? Vary the shape as you will, but remember that the reason the bonnet exists is that it may protect a head. When you have satisfied yourself on this point, trim it according to your taste. If your labours invariably result in what you would call a "hat" and not a "bonnet," what then? It will only show that in so far as a bonnet differs technically from a hat is it indefensible, and bonnets must be discarded in favour of hats. If the result of your labours comes under your definition of a bonnet, so much the better. What I want to insist upon is that your work must be designed and ornamented on intelligible principles. Your construction may be decorated, but your decoration may not be constructed.

Let it not be forgotten that in trimming, or, as I should rather call it, decorating an article of dress, artificial flowers are inadmissible, so are stuffed birds, whether artificial or not, so also are bows.

Artificial flowers are inadmissible because they seek to deceive; they endeavour to persuade people that they are real. Untruth is the sworn foe of art. "It is not very wicked," you may say, "to wear a false flower; it harms no one, and often supplies a very needful piece of colour." To this I reply that there is no reason why you should not have the colour: as a rule, our dresses are too devoid of colour; but colour introduced in a false fashion does but aggravate the falsehood. Wicked, of course, it is not to wear false flowers, judged from a *moral* standpoint; but, judged from the standpoint of art, it *is* wicked, inasmuch as one of the very first demands of art is for Truth. Conventional flowers worked on a dress or elsewhere are quite admissible, because they profess to be nothing but an ornament, and it is patent that they can be nothing else; but flowers stuck in the hat are a delusion.

Still more indefensible is the practice of wearing stuffed birds. It is conceivable that one might pluck flowers and adorn oneself with them; but it is not conceivable that one would hang dead birds about one's person. Birds, *as* birds, in distinction to feathers, have no business in our costume at all.

Then there are the bows. A bow is primarily an ornamental way of tying two ends of ribbon, and it is, therefore, a violation of truth to have a bow where it has not, and cannot even be supposed to have, any such purpose. To manufacture bows, and then to stick them sporadically about a dress, or a hat, or anywhere else, is both false and feeble. The usual defence is set up that they are for ornament and colour. I say that ornament so feebly conceived is no ornament, and colour so crudely applied is an eyesore. If you must have ornament choose some other form than that which is devoted to expressing a particular way of uniting two ends of ribbon. It is mere laziness and lack of invention which leads to the ornamenting of dresses with false bows.

It may be urged against me that while I am very ready at tearing a dress to pieces, there is no such alacrity displayed in inventing something to take its place. Very likely: I am neither a tailor nor a dressmaker. I am a mere signpost, and a signpost would be neglecting the very object of its existence if it were itself to go along the road to which it points others. But as a matter of fact, there is so much that is good in the costume of the day, and many of the defects are so easily remedied, that novel constructive suggestions are not much needed. Some of the hats now in vogue are beautiful, and the prevailing style of arranging the hair is admirable in many respects. Dresses are quite capable of easy improvement by simplifying the skirt and taking more care of the ornamentation. Worked borders offer a wide scope for the display of taste and ingenuity.

Much more advantage might be taken of difference in texture than is now the case in choosing materials. The large cloaks with fur-lining are excellent; and so, in some respects, are ulsters; but avoid false hoods as strictly as falsehoods. The dummy hoods, made only for show, and lined with a patch of blazing colour, are very despicable. At the same time, rich colours might very well be more abundant than they are, only they must be used with judgment and contrasted with taste. Indeed, the final arbiter in dress must be individual taste; and real art will never reign so long as every one meekly follows the fashion. Every lady should think for herself, should (as it were) make a study of herself. The graceful and the ungraceful, the thin and the fat, the tall and short, cannot all wear the same kind of dress with equally good effect. But by giving the matter careful attention and frankly recognising her own peculiarities, every one might become a walking work of art; we should see greater variety, more ingenuity, and less of that thoughtless fetish worship which is the most alarming feature in costume. True, the fetish at this moment is not so barbarous as in the past, but what guarantee have we that he will not again lead us into deplorable extravagancies, unless we thoroughly comprehend the great truths of which he is the distorted image, and resolve to be guided by them individually instead of meekly accepting the interpretations of the fashionmongers?*

"GREAT PAUL" ON HIS PROGRESS.

"GREAT PAUL" has shown considerable reluctance to charm London with his sonorous voice. His journey towards his cathedral home has been slower than one of those royal progresses which his march brings to mind. On the 17th of May he only advanced 100 yards towards London, and half this distance on the following day. Had the event occurred 600 or 800 years ago, when such a bell might perhaps have been cast, but when no Brindley, Telford, Macadam, or Stephenson had arisen to make plain the way for its transport, it would by this time have crystallised into legend; and a church of St. Paul *extra muros* would have probably arisen over that spot near Fenny Stratford where the wheels of the trolly that bore the great bourdon were, for a time "all but buried in the clay soil."

Far be it from us, however, to laugh at the trouble of the founders. The bell, from the best accounts, is a noble one, and it is especially natural for one who, like the writer, was born under the very shadow of the dome of the metropolitan cathedral, to desire to hear an external voice, of tone fit for the grandeur of the structure, sound forth from the belfry. By why was the risk of sending the bell by road incurred? It must be remembered that there is a distinct limit as to the size of the largest article that can be conveyed by railway,—a limit which may be stated at about 10 ft. 6 in. in each dimension. But surely there is also a limit to the proper weight and bulk of transportation by road. On the last occasion on which we called attention to the public inconvenience caused by sending enormous structures drawn by traction engines on the ordinary roads, we incurred the wrath of a contemporary. Notwithstanding that, we must be permitted to say that such a practice is distinctly retrograde, and attended with cost, with inconvenience, and with danger. It is one which would have been impracticable before the abolition of the turnpikes, and of which, in consequence, the propriety has never been discussed. It is, we think there can be no manner of doubt, objectionable for many reasons.

It may be urged that the utmost saving which can be effected by the use of an iron

* To be continued.

railway is known, that it affects road friction only, and that it effects a saving, as to this element of resistance, of perhaps five-sixths, which is capable of exact valuation; while the more important element of the resistance of gravity is unaffected by the improvement. That is true; true, that is to say, as compared with a good ordinary road. But what is left out of sight is, that while the facilitation afforded by the rail is definite, and cannot be increased, the amount of obstacle which may be incurred by the absence of the rail is capable of almost infinite increase. On a well-made Macadam road, in good condition, the resistance to traction on the level is about 45 lb. per ton. But this resistance rises rapidly with the deterioration of the road. On a gravel road laid on earth it is 140 lb. per ton; and in a case in which the wheels of a truck sink up to the axle, it is difficult to say what is the proportionate resistance.

Now, Great Paul weighs some 17 tons; the truck which carries him can hardly be estimated to weigh less than 4 tons. If this weight is put on four wheels, even if they were 18 in. wide, we only obtain some 72 in. of bearing surface, except by the depression of the road, so as to enable more of the circumference of the wheels to rest on it. But we thus get an initial pressure of 0·3 ton, or 672 lb. per square inch of road, or 6 cwt. per inch of this enormous tire, being 1-5th more than the allowance of Sir John Macniel. In fact, we are close upon the crushing resistance of ordinary brick, and the least lurch or inequality that would throw more than its fair share of weight on a single wheel would produce that crushing weight. Was it either wise for the transporters, or fair to the maintenance of the highways, to expose them to such a destructive action?

It has been advanced by a contemporary that the bell could not be sent by railway, because its weight was too great for the works of any railway to support! Of course, the founders of the bell made no such mistake as this. Locomotives of more than twice the weight are used for express trains, and the weights on their driving-wheels are often far more than nine tons per pair.

We have not before us the exact dimensions of Great Paul, but we think that, if within the limits above stated, they are yet, no doubt, such as to require the construction of a special truck to allow, if carried by rail, of passage under the bridges. As to water carriage, we are not aware of the exact state of the communication with Leicester; but the Grand Union Canal runs through that town, and affords, we should have supposed, or ought to afford, the more convenient route for the transport of such an object. At all events, if it does not, it would be doing a public service, especially at the present time, to point out what hindrances exist to the performance of its proper function by this ancient line of inland transport.

Of course, the founders of the bell could have no object but to send their fine casting to its destination by the mode that would be at once the safest and the most economical. It is, therefore, of no small service to the bell-founder, the builder, the architect, the tradesman who deals with objects of great weight and bulk, in whatever materials, to understand clearly the limit which weight imposes on a transport by common road. And it is of no less importance to these persons, and to all the rest of the industrial public, to know what are the limits as to size imposed on our means of transport by rail and by canal. As to the road, if we allow 5 cwt. per inch for four 9-in. wheels, we have a weight of 9 tons, which we take to be the extreme load permissible for the ordinary road. As to the other routes, we shall be glad if these remarks elicit any information.

We are glad that the struggle with the soft place near Fenny Stratford has been overcome, and that the successive arrival of Great Paul at Dunstable and at St. Alban's was welcomed (like Jumbo by the smaller elephants in America) by the voices of the local bourdons. We wish all success to his final ascent to his home, whence we hope that his voice will have been heard by the time that these remarks are in the hands of our readers. It will be inaugurating, let us trust, the commencement of a public service of many centuries if the journey of the bell leads to the clear determination of the true conditions of the inland transport of objects of colossal size and weight.

THE A B C OF THE ELECTRIC LIGHT.*

ELECTRO-MAGNETISM — MAGNETO-ELECTRIC MACHINES—STORAGE OF ELECTRICITY—ARC AND INCANDESCENT LIGHTS.

In the year 1819 a Danish electrician named Oersted discovered that when a wire connecting the producing and collecting plates of a galvanic pair was passed over a magnetic needle, the current passing through it immediately deflected the north end of the needle, either to the west or east, according to the direction in which the current was passing. The following diagram will make the matter clearer. T is the usual trough holding dilute sulphuric acid and the ordinary copper and zinc plates, C and Z. The connecting wire, *w w w*, which, in this figure, is represented as being continuous, passes first over and then under a mariner's compass, N E S W, the current taking the direction shown by the arrows. The dotted lines on the dial of the compass show the position of the needle as long as the current is passing. If we remove the wire and replace it by a bar-magnet with its north pole pointing to the north, exactly the same result will ensue. If, on the other hand, we dip the current-carrying wire, *w w w*, into some fine iron filings, they will adhere to it; in other words, a wire with a galvanic current passing through it has, to all intents and purposes, many of the properties of a magnet.

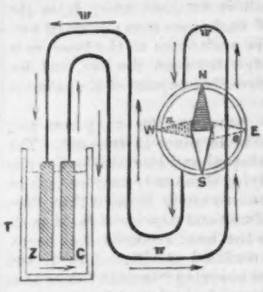


FIG. 4.

If, instead of the current passing *up* in *front* and *down behind* the compass, we arrange the wires so that it passes *down* in *front* and *up behind*, the compass-needle will swing to the east instead of the west. Every time that the connecting wire passes before and behind the compass needle, the effect of the current on the latter is increased, so that if a very delicately-hung needle is set to swing in the middle of a flattened spiral formed of many thousands of turns of fine wire, we have an instrument by which we can measure infinitesimal quantities of electricity. In such an instrument, the wire is covered with fine silk to prevent the electricity from passing from one turn to another. We thus have a ready means of knowing not only when a galvanic current is passing through a wire, but also of knowing in which direction it is going. The wire through which a current is flowing, if wrapped round a soft iron bar in a spiral form, immediately transforms it temporarily into a powerful magnet. Fig. 5 shows how this is effected in the case of a horse-shoe electro-magnet.

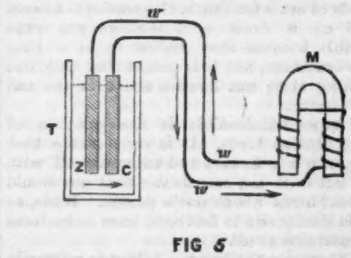


FIG 5

T is the trough containing Z, and C the zinc and copper plates, and *w w w* is the closed conducting wire which passes round the two legs of a soft iron horse-shoe, M, which it temporarily converts into a very powerful magnet. In practice, the legs are covered with several layers of coiled wire protected by silk or cotton. The horse-shoe need not be made in one piece, but may be formed of two straight cylinders of soft iron united by a flat piece of the same metal firmly screwed into each leg. Such magnets are used in the construction of electric bells, and are the foundation of every machine connected with the production of current electricity by motion.

We see thus far that by using certain contrivances of a not very complicated nature we may convert galvanic or current electricity into magnetism. Having proved this fact to himself from numberless experiments, it entered into the great mind of the illustrious Faraday that if we can convert galvanism into magnetism, we ought to be able to turn the tables, and convert magnetism into galvanism, and experiments soon proved the correctness of his supposition; for he found that by simply moving a magnet in close proximity to a coil of wire, part of which passed before and behind a compass-needle, a galvanic current was produced which caused the needle to swerve one way when the magnet approached the coil, and the other way when it was moved away from it.

This is shown in fig. 6, in which C represents a coil of wire with the united ends passing before and behind a compass N E S W. *s M n* is a bar-magnet, *n* being its north pole. Now, when

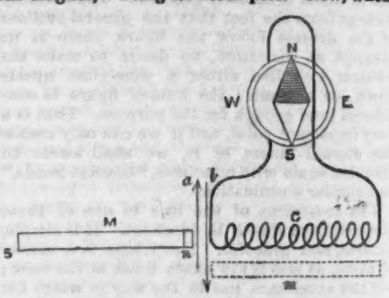


FIG 6

M is passed before the opening of the coil C in the direction of the arrow *a*, a momentary current is set up in C, which, passing, let us say, before and behind the compass-needle, causes it to swing to the west. When the magnet is moved back again in the direction of the arrow *b*, another momentary current is set up, but in the contrary direction, swinging the needle to the east this time. If the magnet is thrust into the coil, and withdrawn, the same double effect takes place, or if it is moved into the position shown by the dotted line, and taken away again, the same double current is generated; in fact, almost any double movement of the magnet in close proximity to the coil will create a backward and forward current. Exactly the same thing happens if the magnet is kept stationary and the coil is made to move. It was further found that if a soft iron bar were inserted in the coil C, the effect was all the greater.

Figure 7 shows a magneto-electric arrangement in which a horseshoe magnet, N S, turns upon an axis, C, in either direction, as shown by the arrows. L R is a horse-shoe of soft iron, the two legs of which are surrounded by a coil of wire, the rest of which passes before and behind a compass in the usual way. Now, when N S is rotated it is clear that N and S pass both L and R, and on each occasion a double current is produced. Now, let us suppose that instead of only one iron horseshoe we have ten arranged concentrically round the centre C, and that we have also ten horseshoe magnets set radially like the spokes of a wheel, and revolving several hundred times a minute, we evidently have the power of creating a very intense current. In practice, instead of only a single coil of four turns being wrapped round the legs of the soft iron horseshoe, the wire, which would be covered with cotton or silk, would be wound round each leg in several layers as closely as possible, so as to form a large number of rings, all wires from the ten left legs being joined together, those from the right legs being also joined. We have said before that it did not matter, as far as the principle went, whether the magnet revolved or the iron horseshoe, with its coils of wire on each leg, so in most machines, such as that of the French Alliance Company, the coiled iron magnets are made to rotate. One of these consisted of an iron axle rotating in a suitable framework. On this axle were strongly keyed six brass discs, upon the circumference of each of which were fixed sixteen coiled soft iron horseshoes. Around these were six sets of eight

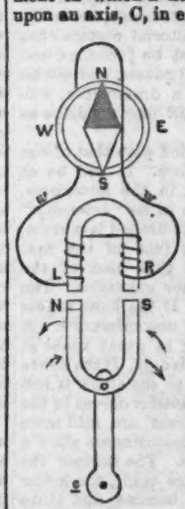


FIG 7

* See p. 603, *ante*.

fixed magnets arranged radially. Thus there were ninety-six iron coiled horseshoes revolving in close proximity to forty-eight permanent magnets at a rate of 400 revolutions per minute. Now, as the leg of each permanent magnet passed sixteen times before a coiled horseshoe at every revolution, sixteen changes of current were made during that time; that is to say, 6,400 in a minute, or over 100 per second, producing an amount of electricity capable of maintaining a very brilliant light between two carbon terminals. Such machines as these answered their purpose as far as they went, and were used both in England and France for the purposes of lighthouse illumination. They were, however, far from perfect, and very cumbrous, and soon gave way before what are now called dynamo-magneto-electric machines, or, shortly, dynamos, in which permanent magnets are entirely dispensed with.

It occurred to Dr. Siemens, Sir Charles Wheatstone, and, indeed, to several other electricians, almost simultaneously, that as an electric current passing round a bar or horseshoe of iron produced a magnet, if the wire *w w* in fig. 7 were passed round the permanent magnet N S it would increase its power, and that the power of N S being thus increased, the power of L R would also be increased, and so on almost *ad infinitum*. Experiment proved the supposition to be correct, for at each turn of the machine the power increased until both L R and N S would hold no more magnetism. At first sight this looks like a creation of force, but it is not so; for if we were to turn a hand-machine of this kind we should find it necessary to exert additional muscular power at each revolution, such muscular power being converted into electrical force. In accordance with this principle, most of the machines now in use are constructed without a permanent magnet, their place being taken by soft iron horseshoes, which, having been once touched with a permanent magnet, retain an infinitesmal charge of magnetism, which, however, is quite sufficient to begin with. In some cases it is not even necessary to touch these iron horseshoes with a magnet, as they contain sufficient magnetism, either from lying in the direction of the magnetic meridian,—that is to say, nearly due north and south, or from a small amount of magnetism being imparted to them during the process of forging. The idea of making the electric current react upon the permanent or temporary magnets which originated it, and so increase it, and the resulting abandonment of the use of permanent magnets, which were always getting weaker, necessitating continual remagnetising, have done more for rendering the electric light practicable than perhaps any other of the numberless inventions which have astonished the electrical world during the last five-and-twenty years.

Another great step in advance was the Gramme ring, which is the foundation of the dynamo-machine bearing that name. The machine which we have already considered gives currents alternating in direction as each leg of each magnet approaches and quits each leg of the coiled horseshoes, but the Gramme machine gives a continuous current in one direction only. The Gramme ring in its simplest form consists of a ring of soft iron of circular section, as shown fig. 8, *s*, *o*, *n*, *o*, surrounded by a continuous coil of covered wire not shown in the figure. A bare ring is cut through this covering right round the circumference, so that two conductors, *c c*, may, so to speak, wipe against the bare metal of the coil at *o* and *o*, and so convey the current to the place in which it is wanted. The coiled ring is rotated rapidly in the direction of the arrows, and the strongest magnetic points of the ring, namely, those at *s* and *n*, where it is in close proximity to N and S, continually changing as it revolves, a continuous current is produced in the coil of wire, which is carried away by the two conductors *c c*. In practice several coils are wound round the ring, and stationary soft iron bars are used to generate the current by virtue of the infinitesimal amount of magnetism contained in them.

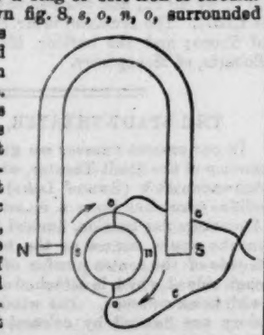


FIG. 8.

In the Brush machine, which is a skilful attempt to improve on the Gramme, the ring is made with a series of depressions, within which a number of separate coils are wound: thus the ring is only partially covered with the wire coil, and not wholly enveloped, as in the Gramme. The name of this machine is taken from that of the inventor, and not from the metal brushes which are used to collect the electric current. The generating ring turns at the rate of from 800 to 1,650 times in a minute.

In the Siemens machine the revolving coil is wound lengthways on a cast-iron cylinder, somewhat in the manner in which silk is wound on a netting-needle, the covered wire passing through two holes bored for the purpose, and lying in two longitudinal hollows cut in the iron.

Lontin's machine consists of ten coiled cylinders arranged like the spokes of a wheel, revolving between the legs of a couple of soft iron pillars, coiled with several layers of covered wire. The current produced is led to a distributing machine, consisting of ten coiled cylinders fixed radially on a revolving-shaft, which works inside a hollow drum containing the same number of coiled soft iron cylinders fixed to its inner surface.

It would be impossible to explain in detail the whole of the various machines at present in use, suffice it to say that they all work upon the same principle.

When sticks of carbon are attached to the wires connected with the generating and collecting-plates of a galvanic battery of, let us say, ten pairs, in the same way that the three pairs are connected in fig. 2,* and the two pieces of carbon are united, the current will pass. If they are now separated a certain distance the current will still pass, but it will carry with it a stream of highly luminous particles of carbon, forming what is known as the galvanic arc. For some reason that has never been explained, the carbon from which the current is proceeding, —that is to say, the carbon connected with the receiving-plate of the battery,—is consumed very fast, while the carbon in connexion with the generating-plate of the battery is acted on only very slightly. For this reason alternating currents are used when dynamo-machines are employed, so that both carbons burn away at the same rate. Carbon rods burn away at the rate of about 5 in. an hour, and if some contrivance were not used for keeping the consuming ends at the proper distance from each other, the current would cease. Before the invention of the numerous dynamo-machines at present in use, batteries of fifty cells and upwards were used for generating the electric light, but at the present day, except under peculiar circumstances, dynamo-machines are almost exclusively used, as being cheaper and less troublesome. The carbons themselves are made of powdered gas retort deposit, mixed with a third of its weight of calcined lamp-black and syrup, the mass being squeezed through a hole in a plate, after which they are allowed to dry and heated to a high temperature.

In the early days of the electric light, clockwork was used to keep the carbons at the proper distance from each other, and is still used in the Serrin lamp, one of the most efficient of all. Most of the others are regulated by an electro-magnet, which draws the carbons nearer to each other whenever the strength of the current slackens through the distance between them becoming too great.

Various contrivances have been devised from time to time to do away with the necessity for any sort of complicated regulator. In the Wallace-Farmer lamp two plates of carbon, 9 in. long by 5 in. broad, are kept apart by means of an electro-magnet, which attracts a plate, to which the upper one is attached as soon as the current passes, and keeps it at the proper distance. The light travels all over the carbon surfaces, the electric current taking the shortest road. These lamps burn for 100 hours and more, but require to be regulated every half-hour or so. In the Rapieff lamp four carbons are used, so placed as to form an inverted and upright V, the light being produced at the point of intersection.

Jablochkoff's electric candle consists of two carbon rods, separated from each other by a strip of china clay or plaster of Paris. A chip of carbon is placed across the top, and as soon as the current passes this is fused and an electric arc is formed between the two points, which being side by side, are always at the same distance from each other. The china clay melts with the intense heat, and forms a conductor between the two points. Alternating currents are used with the Jablochkoff candle. Wilde's candle is said to be an improvement on Jablochkoff's, and consists of two cylindrical rods of carbon mounted side by side in separate holders. The carbons are covered with a thin coating of lime to prevent the light from travelling down the contiguous sides of them. Wilde's candle, from its simplicity, seems likely to drive all others out of the field.

The simplest of all electric lights are the incandescent lamps of Swan, Edison, and others. They consist of a loop of carbon connecting the two wires supplying the electricity, and enclosed in a vacuum. The light is produced by the electric current heating the carbon filament to a white heat. The carbon having no air about it is not consumed, but although hardly thicker than a pin lasts for 1,000 hours before it crumbles away by the intense heat. The different incandescent lights only differ in the shape of the lamps and in the source from which the carbon is obtained, Edison using carbonised bamboo, and Swan cardboard. The incandescent light is most undoubtedly the light for domestic purposes.

Of late, we have heard a great deal about what is popularly called the "storage of electricity," but, as we shall presently see, the term is an erroneous one. Going back to the Daniell's pair, shown in figure 3,* let us suppose that we join up the wires and work the pair, so to speak, to death, until, in fact, no more electricity is evolved, taking care, of course, not to renew either the acid in the porous pot or the sulphate of copper in the copper vessel. We shall now have a strong solution of sulphate of zinc in the porous pot and dilute sulphuric acid in the copper can, the whole of the copper contained in the primary solution having been deposited on its sides in the form of metal. Now let us send through this worn-out pair a powerful current of electricity, either from another battery or from one of the dynamo-machines just described, but in a reversed direction. As the current circles round two things happen. First of all, the dissolved zinc gradually deposits itself on the zinc rod, and the copper deposited on the sides of the can begins to dissolve. If we keep the action up long enough, the whole of the deposited copper will be re-dissolved, a fresh solution of sulphate of copper thus being formed, while the whole of the zinc in solution in the porous cell is once more deposited in its old place. We have, in fact, renewed the life of our pair and restored it to its primitive state of vigour, once more ready to supply a current of electricity for a certain time.

We should hardly call the operation just described a "storage of electricity," yet in principle it is similar to the process adopted for making Faure's secondary batteries. It has before been said that when two metals are plunged into a liquid acting unequally upon them, a current of electricity is generated on the surface of the one which suffers most. This fact is not only true of dissimilar metals, but of the same metals and their oxides, when the latter are conductors of electricity. A description of the method used in the formation of Faure's secondary batteries will make this clearer. We must premise that there are three principal oxides of lead, the protoxide, known to most of us as litharge, which contains one dose of metal to one of oxygen; minium or common red lead, in which the proportions are 2 to 3 or 3 to 4; and the peroxide, in which they are 1 to 2. The peroxide, it should be stated, is a conductor of electricity. If two plates of sheet lead be covered with a thick layer of red lead, plunged into dilute sulphuric acid, and a current of electricity driven through them, a peculiar change will take place. According to the direction in which the current is driven the red lead, on one plate will give up its oxygen, while that on the other plate will absorb oxygen, so that in course of time one plate will be covered with spongy metallic lead through the loss of oxygen, while the other will be covered with peroxide of lead through the absorption of oxygen by the coating of red lead. We have now a lead and peroxide of lead pair in dilute sulphuric acid. On disconnecting the battery or dynamo-machine, and joining up the wires, a current of electricity will be generated on the surface of the spongy lead, and will continue to flow until the spongy

* See p. 603, *ante*.

* See p. 604, *ante*.

lead has once more become oxidised. The power of the pair may be once more renewed by again passing a current of electricity through it as before. The present mode of construction is seen in fig. 9, which shows the battery as seen when looking down upon it.

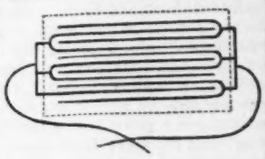


FIG. 9.

Six sheets of lead of such thickness that a square foot weighs 2 lb., are taken, five of them measuring 12 in. by 20 in. and one 12 in. by 10 in. The large sheets are folded into the form of a ⊂ as shown in the figure, a strip of lead being soldered on to the top of each curve as well as to the single sheet. The sheets are painted thickly with red lead on both sides, and against each surface is pressed a piece of felt, the face of which is also thickly coated with red lead, the proportion of red lead to metallic lead being about 3 to 2 in weight. These sheets are placed side by side in a water-tight case, which is filled with dilute sulphuric acid, the alternate sheets being connected together as shown in the figure. There is but little doubt that these secondary batteries will play a very important part in the electric lighting of the future.

THE ST. GOTHARD INTERNATIONAL FÊTES.

The present week has witnessed the definitive opening of the St. Gothard Railway, and the celebration of the inauguration by a series of *fêtes* of unusual brilliancy, attended as they were by Ministers, Deputies, Ambassadors, and other distinguished personages belonging to the three nations principally concerned. Italy, Switzerland, and Germany were all influentially represented on the occasion. On Saturday last took place the departure of the invited Italian guests from Rome, and of the invited German guests from Berlin, both *en route* to Switzerland. The Italians on their way were entertained at a banquet by the Mayor of Genoa, whence they departed for Switzerland on the following day, arriving in Lucerne on Sunday night. About the same time the German guests likewise reached that city. The *fêtes* proper commenced the following morning (Monday, the 22nd inst.) by a trip over the charming Lake of Lucerne and the ascent of the Rigi Kulm, where the guests, who were 500 in number, were entertained by the St. Gothard Directors at a splendid luncheon. The ascent of the Rigi was made in seven separate trains. The guests were conveyed in the afternoon back to Lucerne by the two steamers, the *Italia* and *Germania*, which had brought them out in the morning.

At five o'clock in the evening the President of the Swiss Republic, M. Bavier, who, as we informed the readers of the *Builder* some time ago, is himself by profession a civil engineer, proceeded to the Hôtel National, and there, along with his colleagues of the Federal Council, received the invited guests from Germany and Italy. The Italians were introduced by Signor Tecchio, the President of the Italian Senate, while the Germans were introduced by Herr von Kendell, the German Ambassador at Rome. Among the Germans present were the German Foreign Secretary, Count von Hatzfeldt, Ministers Bitter and Bötticher, Dr. Stephan, the Imperial Postmaster of Germany, ex-Minister Delbrück, and several other Ministers from the smaller German States, in addition to about two hundred members of the German Parliament. The Italian guests included, beside several hundred members of the Italian Senate and Chamber of Deputies, several Ministers and ex-Ministers, among them being Signors Baccarini and Mancini, Generals Menebrea and Minghetti. At half-past six o'clock the whole of the guests in Lucerne were entertained at a splendid banquet by the Swiss President, in the magnificent hotel, the Schweizerhof. Here the health of the German Emperor and the King of Italy was drunk amid the greatest enthusiasm, and speeches were delivered by leading persons belonging to each of the three nationalities. In the evening there were fireworks and an electric illumination of the lake, quay, and snow-capped mountain peaks around Lucerne, the effect being described as extremely brilliant.

The programme of the rest of the festivities included the grand trip of all the guests over the new line, which took place on Tuesday, the 23rd. Before entering the great tunnel, the travellers were entertained at a luncheon at the Göschenen Station, at the north or Swiss end of the tunnel. They reached that place in three trains, which all left Lucerne at close intervals between seven and eight in the morning. After the luncheon the guests entered their carriages again, and proceeded through the great tunnel, which is nine miles and a quarter long, and, therefore, the longest in the world. The trip from Lucerne to Lugano is through some of the grandest mountain scenery in the world, and there is little doubt that the anticipations so freely expressed at these *fêtes* that the St. Gothard line would become the favourite route between Italy and Northern and North-Western Europe will be realised. It is expected that Englishmen in travelling to or from London and the East Indies *vid* Brindisi will in future make use of the St. Gothard route, as it is the shortest as well as by far the grandest in Europe. The engineering difficulties have been frequently described, and it is not necessary here to say more on that subject than that they are such as to raise the St. Gothard line to one of the modern wonders of the world. The *fêtes* in celebration of the final opening of this railway concluded by a grand banquet in Milan on Wednesday, and the return to Lucerne, and a farewell festival in that city on Thursday.

THE LORD MAYOR.

The last act of the Lord Mayor as the Right Honourable John Whittaker Ellis, was to entertain at dinner in the Egyptian Hall at the Mansion House, a large number of architects, engineers, and surveyors, with whom the Lord Mayor was acquainted, or had been connected professionally. There were also many ladies present. On the following morning the Lord Mayor received a letter from the Prime Minister informing him that her Majesty had been pleased to signify her intention of conferring upon him the honour of a baronetcy in connexion with the Queen's recent visit to Epping Forest. Returning to the dinner, the proceedings were understood to be, to a certain extent, private; but several speeches were made. Major Edis, architect, spoke for "The Reserve Forces." To the toast of "My Guests," Sir Joseph Bazalgette spoke for the engineers present; Mr. Horace Jones, P.R.I.B.A., for the architects; Mr. Edward Ryde, for the surveyors; Mr. Huskinson, of Nottingham, for the land agents; and Mr. R. C. Driver, for the Auctioneers. Sir J. A. Picton, Liverpool, proposed the Lord Mayor's health, and Mr. Hardwick gave, and Sir John Humphreys, coroner, replied for, "The Ladies." Amongst the visitors present, besides those already named, were Mr. Whichcord, Mr. Arthur Cates, Mr. E. Woodthorpe, Mr. F. Porter, Mr. Penrose, Mr. John Clutton, Mr. G. Godwin, Mr. Hawksley, Mr. Sturge, Mr. Gore, Mr. R. C. Driver, Mr. H. Currey, Professor Hayter Lewis, Mr. Fenwick, Mr. Cundy, Mr. Vigers, Mr. D. Watney, Mr. E. Tewson, Mr. Ritchie, Mr. G. B. Williams, Mr. Farmer, Mr. E. Norton Clifton, Mr. Squarey, Mr. E. Fox, Mr. Deputy Hammack, Mr. Chadwick, Mr. Coverdale, Mr. F. W. Goddard, Mr. Chatfeild Clarke, Mr. Penfold, Mr. Chinnock, Mr. Garrard, Mr. Galsworthy, Mr. C. W. Driver, Mr. H. Ellis, Mr. T. H. Staples, Mr. Peebles, and Mr. Innes. The Lord Mayor's Deputy in his ward is appropriately an architect, Mr. James Edmeston, who was also present. Mdme. Matilda Ziméri sang very charmingly several songs.

The Right Hon. John Whittaker Ellis, of Byfleet, near Weybridge, Surrey, and of Westbourne-terrace, Lord Mayor of London, upon whom her Majesty has been pleased to confer a baronetcy in commemoration of her recent visit to Epping Forest, is the son of the late Mr. Joseph Ellis, of Richmond, Surrey (a stanch friend of the late John Britton, F.S.A.), where he was born in the year 1829. He was educated at Richmond under the care of the Rev. William Allen. At the age of fifteen he was articled to Messrs. Musgrove & Gadsden, land agents and surveyors, of Old Broad-street. In 1854 he became a partner in the firm which is now known under the style of Farebrother, Ellis, Clark, & Co., Mr. Alderman Ellis being, however, now the sole representative. In 1858 Mr. Ellis married Mary Ann, youngest daughter of Mr. John Staples, of Belmont, near Salisbury. He entered the Court of Common Council in 1864, having previously served in various offices connected with his parish. On the resignation of Alderman Sir John Musgrove, Mr. Ellis, at the invitation of a large number of the inhabitants of the ward, came forward as a candidate for the vacant gown, and was unanimously elected. He is one of her Majesty's Lieutenants for the City of London, and in November last was chosen to fill the office of chief magistrate of the City. He is a member of the Court of the Merchant Taylors' Company, and has been for many years engaged in agricultural pursuits in the parish of Byfleet.

CONGREGATIONAL CHURCH, HIGHBURY QUADRANT.

The group of buildings shown in the illustration consists of a church seating 1,200, lecture-hall in the rear for 650 adults, and the necessary vestries and rooms for committees, ladies' meetings, infants, &c., and service.

The feature of the church is in the large and practically unobstructed area, the supports of the centre lantern being so placed that they only obstruct the view of the pulpit from the passages between the seats.

To keep these piers, of hard York, as light as possible, a wooden superstructure was adopted, covered on the outside with Lascelles's red concrete slabs, cast to a special design; and the whole of the timber framing is so trussed and tied that all strains are resolved into dead weight on the piers.

The school is planned, as an irregular octagon, for a large number of classes (twenty-six), and also to be readily used as a lecture-hall; and it has been found in practice to answer its double purpose remarkably well.

All the timber work is of pitch-pine, wrought in the interior, and without varnish, on the outside left with saw-cut face, and coated with Stockholm tar. The walls inside are faced with hard cream-coloured "gaults," and outside with deep red Suffolk bricks, relieved by moulded work to the openings and dressings of hard Bath stone.

The roofs are covered with slates, and the windows filled with tinted cathedral glass, in geometrical patterns. The warming is by a high-pressure hot-water apparatus.

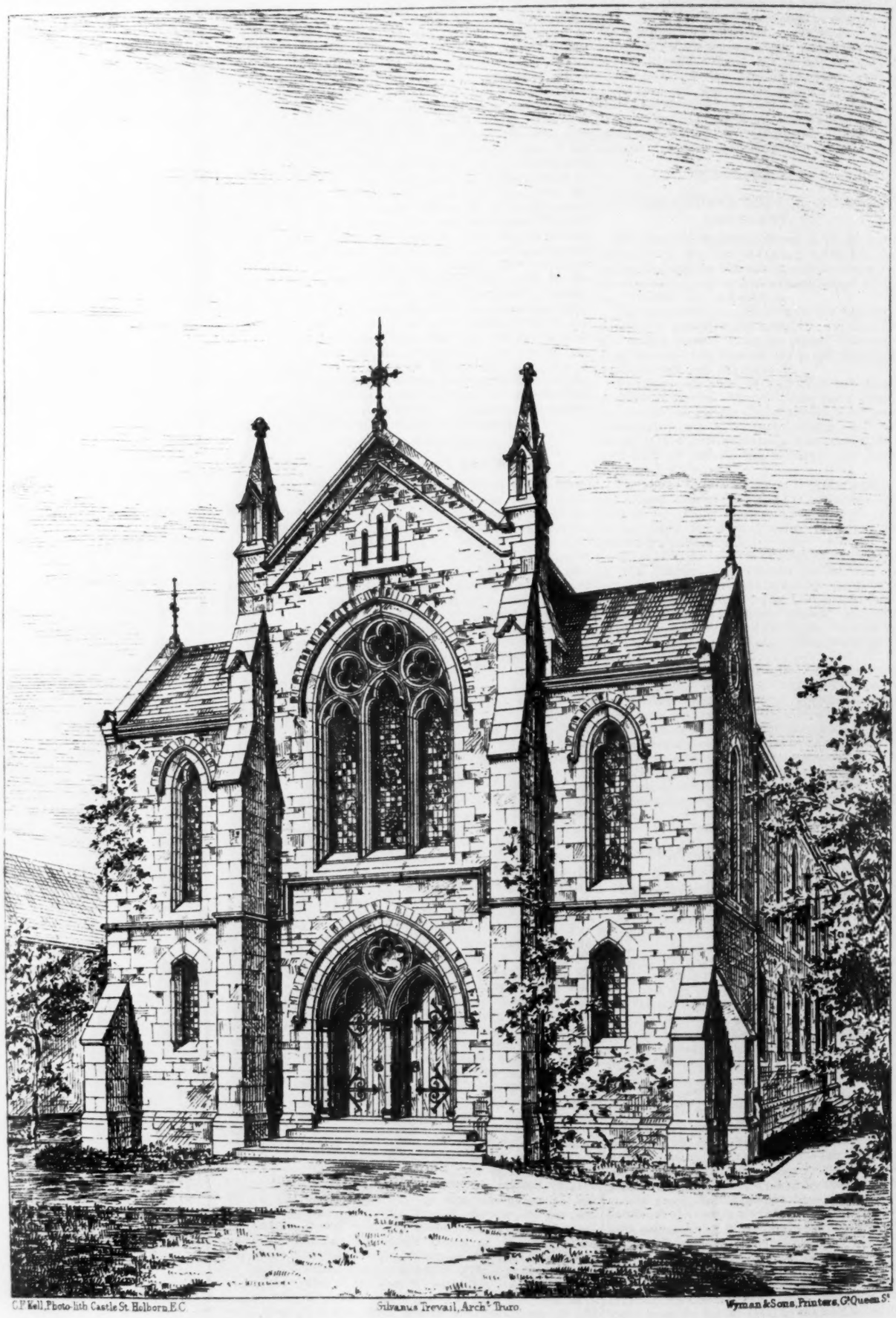
The whole of the buildings, owing to their extent, are necessarily simple in detail, and have been well carried out at an expense of from 11,000*l.* to 12,000*l.*, by Mr. J. Chessum, of Great Eastern-street, under the supervision of the architect, Mr. John Salman, of Furnival's-Inn, Holborn.

MEVAGISSEY CONGREGATIONAL CHAPEL, CORNWALL.

This building is being erected in the romantic little fishing town of Mevagissey, on the south coast of Cornwall, and replaces a chapel of much earlier date belonging to the same denomination. Accommodation is provided for 400 persons. A gallery runs completely round the building; the roof is partly open and of pitch-pine, and the pews and all other joinery are of the same wood. The external dimensions are 66 ft. by 40 ft., and the amount of the contract is 1,257*l.* The architect is Mr. Silvanus Trevail, of Truro; and the builder, Mr. Benjamin H. Roberts, of Mevagissey.

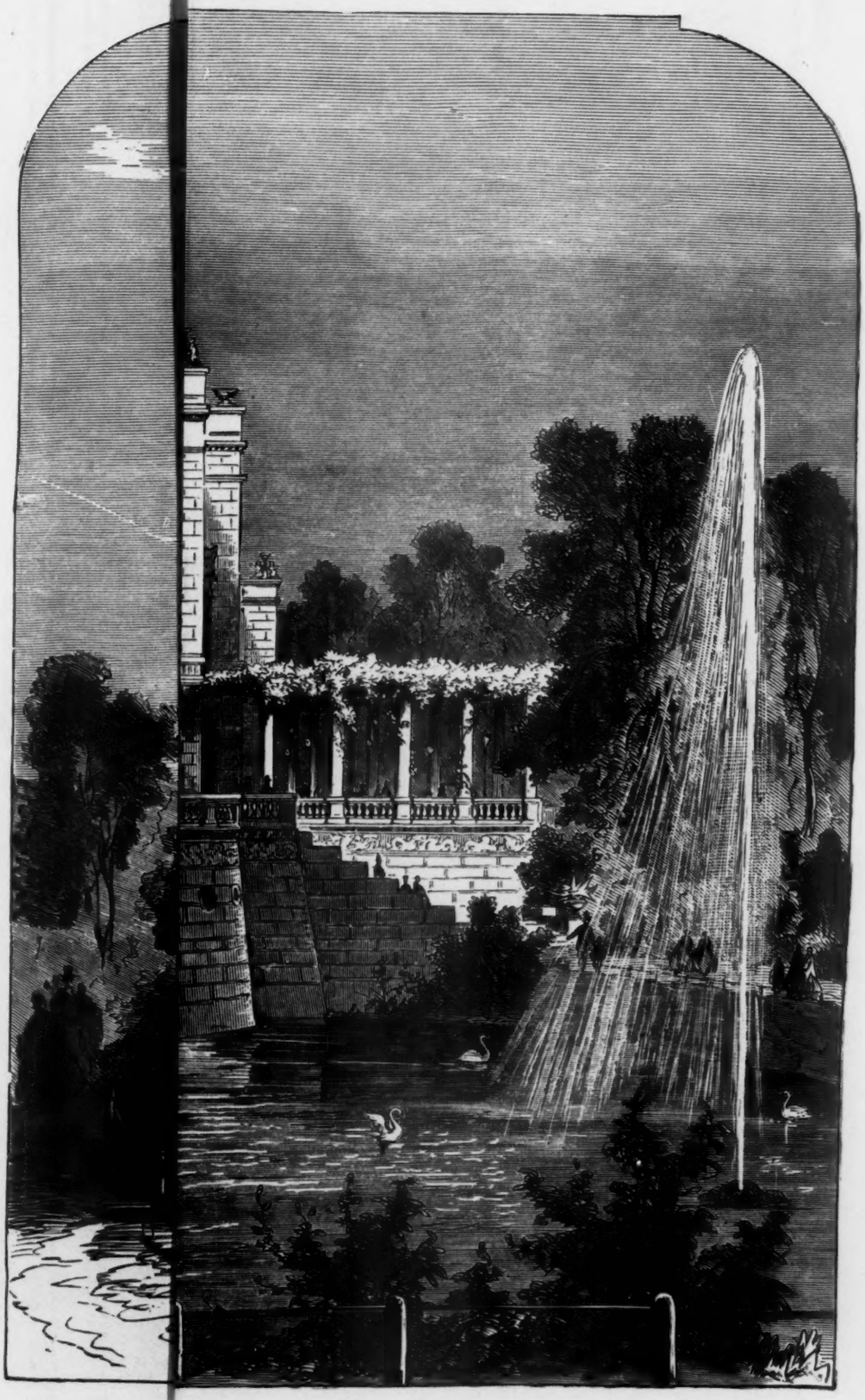
THE STADT-THEATER, LEIPZIG.

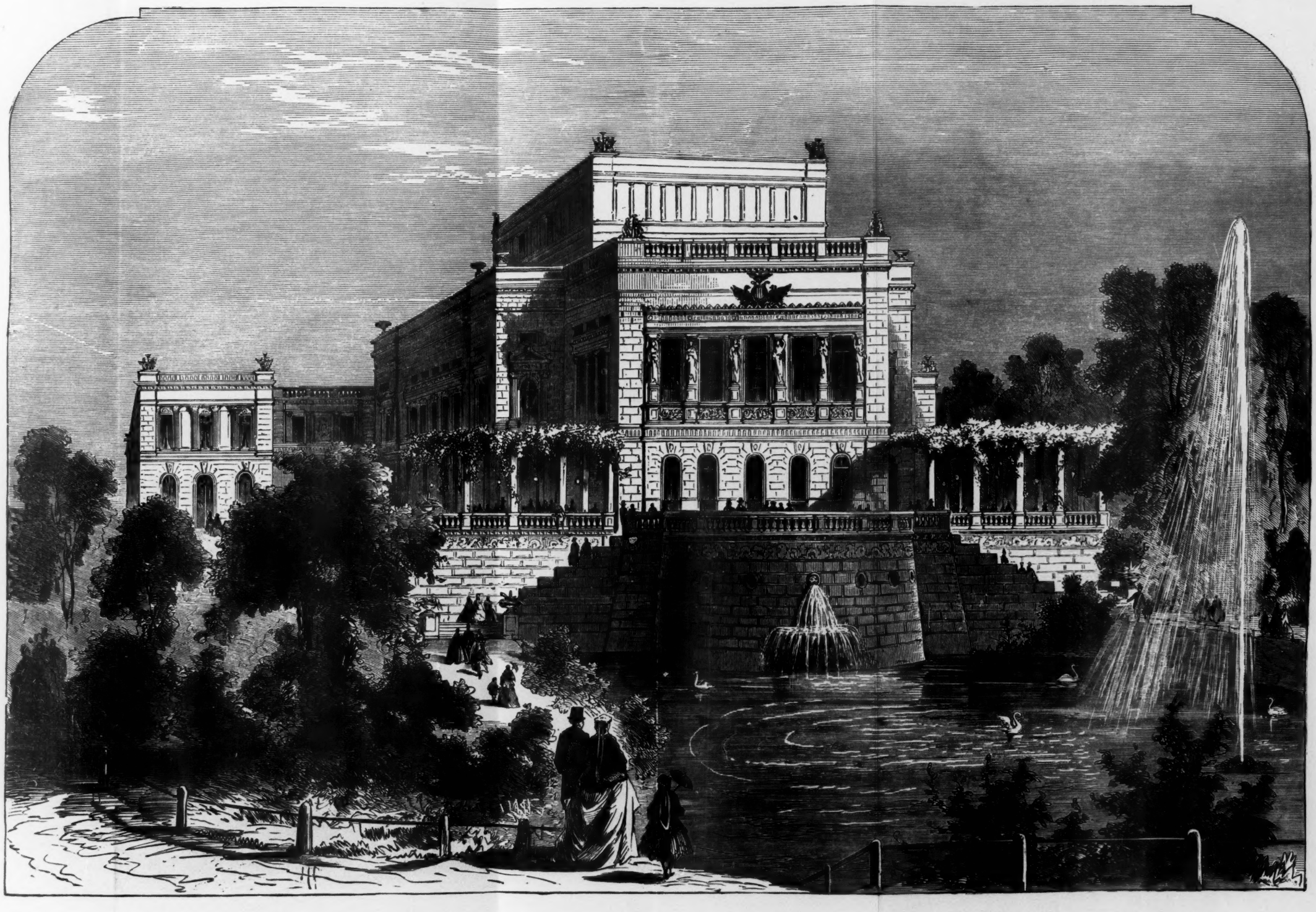
In our present number we give a view of the portion of the Stadt-Theater, which abuts on the Schwanenteich (Swans' Lake). The imposing edifice here rises upon a massive substructure. A semicircular bastion, flanked by stairs broken in the angle, serves as the base for the rear façade of the centre portion of the building, to each side of which is attached a covered balcony with brick columns. The windows of the first story are flanked by colossal caryatides, over 25 ft. high. Above the centre portion rises the "gloriette," of plain elevation, but necessary for drawing up the scenery. The height of the stage from the lowest level to the roof is 140 ft. The stage itself is 100 ft. wide and 80 ft. deep; the proscenium opening 51 ft. wide and 48 ft. high. In the auditorium,—of the usual horse-shoe form, and which contains, besides pit and stalls, four tiers rising above each other as in an amphitheatre,—there is room for 1,900 persons, of whom 1,450 are provided with seats.



C.P. Kell, Photo-lith Castle St. Holborn, E.C. Silvanus Trevail, Arch.t Truro. Wyman & Sons, Printers, G.t Queen St.

CONGREGATIONAL CHURCH,
MEVAGISSEY, CORNWALL.

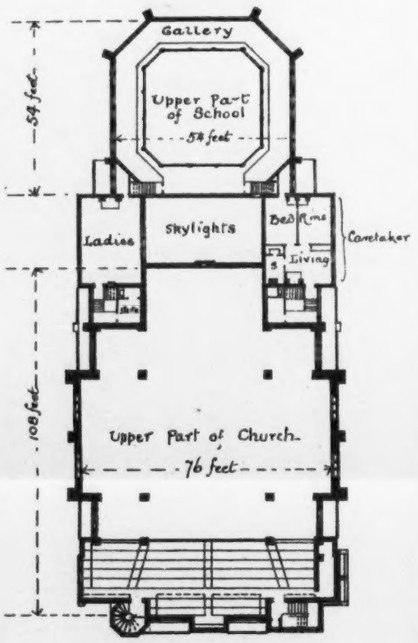




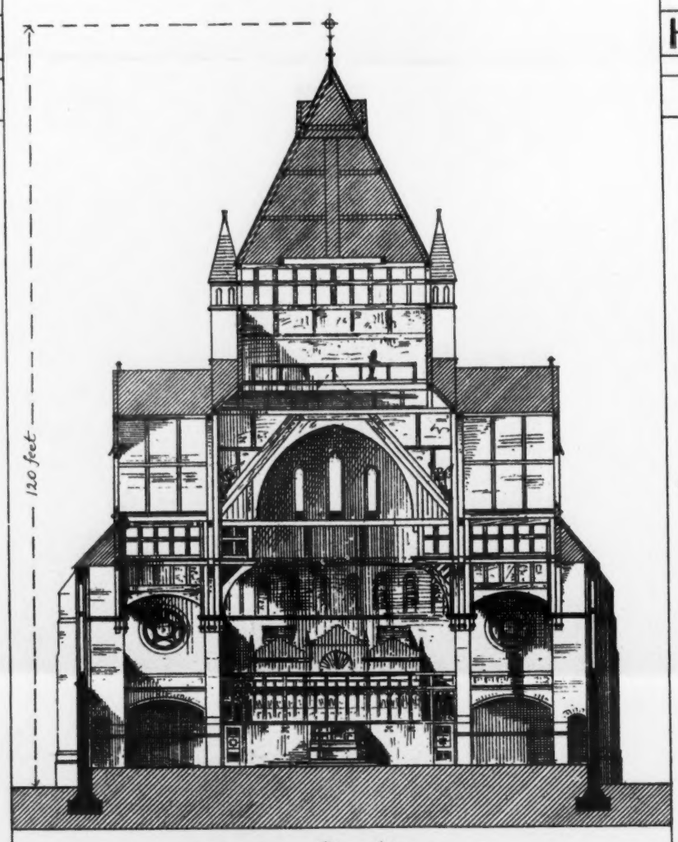
THE STADT-THEATER, LEIPZIG.

CONG.L CHURCH & SCHOOLS

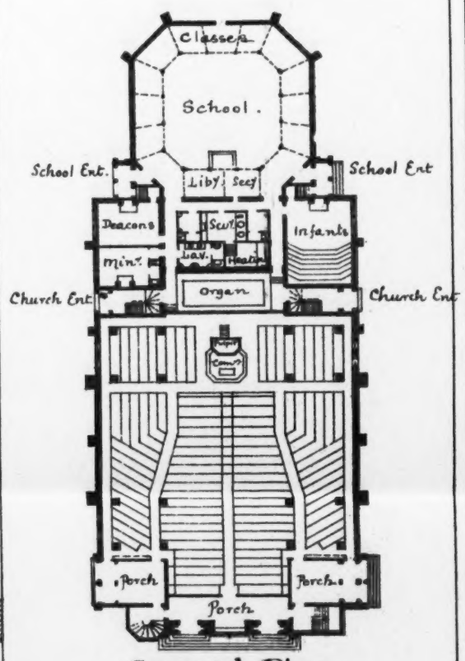
HIGHBURY QUAD.T LONDON: N.



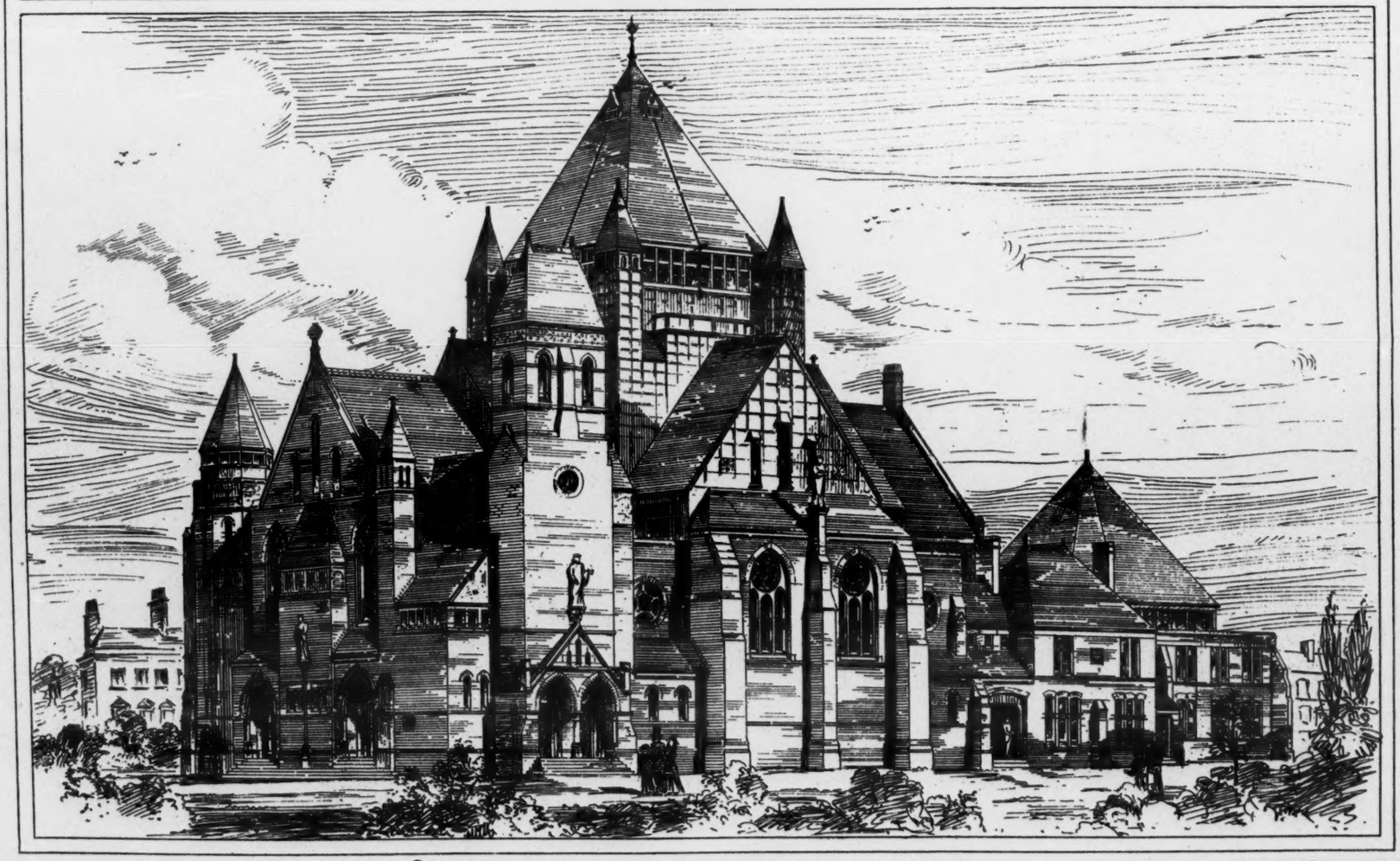
Gallery Plan.



Cross Section.



Ground Plan.



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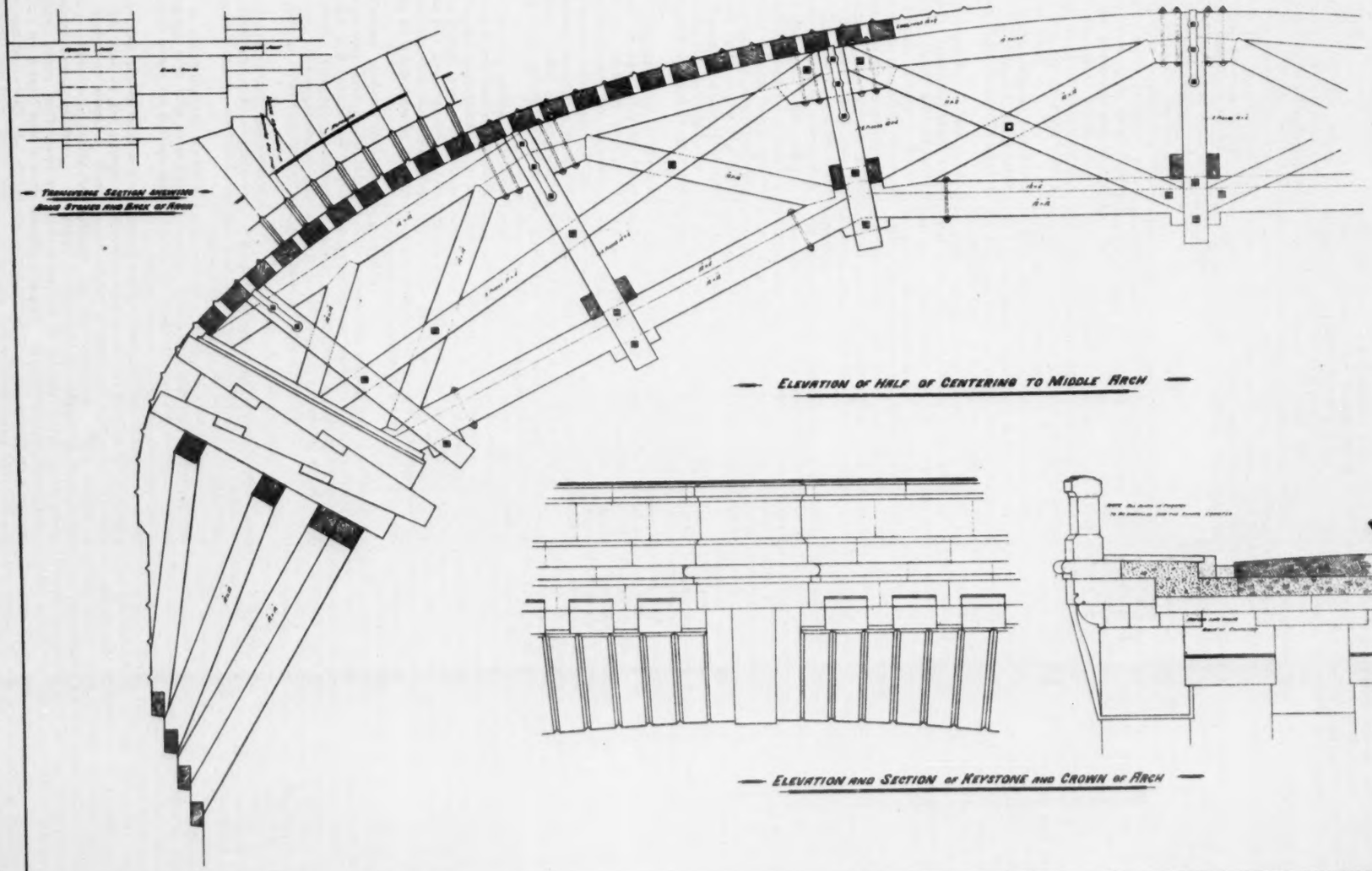
DRAWING Nº 3

DESIGN FOR A STONE BRIDGE.



TRANSVERSE SECTION SHEWING BOND STONES AND BRICK OF ARCH

ELEVATION OF HALF OF CENTERING TO MIDDLE ARCH

ELEVATION AND SECTION OF KEYSTONE AND CROWN OF ARCH

Whiteman & Bass. *Photo-Litho* 236, High Holborn

Wyman & Sons, Printers, 74 Queen St.

PRIZE DESIGN FOR A STONE BRIDGE.

We add, as promised, to the illustrations of Mr. H. Phelps Drew's design for a stone bridge, to which the Grissell Gold Medal has been awarded, an additional page, showing, amongst other things, the centering for the middle arch.

A CHAT ABOUT HOUSE BUILDING.*

Roofs.

It seems a pity that our roofs cannot be finished when the house is built once and for all, and that as soon as the workmen have cleared away the roof begins to go wrong, and to the end of our lives worries us continually. We get a heavy rain. "Please, sir," says the servant, with the breakfast tray, as immortalised in *Punch*, "there is such a damp spot on my bedroom ceiling." The sparrows build their nests in our down-pipes,—how they manage to escape drowning I could never make out, but the overflow and the damp will show us what they have been at. After a windy night we find a slate or two sticking in our flower-beds, we all know what that means. We are awakened by the wind in the middle of the night. "I do hope," we say, "that chimney-stack is quite safe, the wind is this way, and if it should come over it will fall right across our bed."

Let us see if we cannot scheme something that would, at all events, mitigate these troubles and make our roofs a little more like what a good roof should be.

Flat roofs are very convenient. Iron girders and joists, as already described, faced with slabs and concrete, and finished with asphalte, with a fall for water, make a very good roof, and if the rain-water is not wanted to be saved in a tank for domestic purposes, a rock garden can be planted on it, and many plants of the Alpine species will grow well, and give no trouble; or a glass roof can be put over the flat, and a roof greenhouse be thus constructed. It might be said the glass would blow away in so exposed a place; but I have tried it, and I do not think for ten years I have had a broken pane of glass; this forms a capital ventilator, for the house staircase leads to the flat roof, and by leaving the door open, a continual current of air is drawn up through the house by the heat of the glass, and escapes through the laps or the ventilators.

One advantage of this system is, it gives a room where an hour or two after the other rooms have become too dark for reading or drawing, the work or amusement may be carried on. I know where rooms constructed in this manner have been put up for artists, not on the top of the house, but on lower premises at the side of the building. The principle, however, is the same.

The oldest roof, perhaps, in existence is made of concrete, of a dome shape, and in one piece, like an inverted basin, and appears now to be as sound and perfect as it ever was. It has been covered with copper, but the copper has gone long since, and the concrete alone remains, defying the weather, as it has done for twenty centuries.

Many ancient roofs were covered with heavy tiles, about 2 ft. each way, and 1¼ in. thick, and turned up at each end with a half-round tile to cover the junction. The great advantage of this system was that they would sustain the weight of a man, and no wind was likely to disturb them.

Our old cathedrals are covered mostly with lead, cast in sheets, thick and soft, wonderfully durable and pliable, and costing very little to keep them in order.

Some old houses in out-of-the-way places in England are still roofed with thin stone flags, the larger ones next the eaves, the smaller near the top.

All these systems have the advantage over tiles or slates, that the wind or the passage of workmen is not likely to displace them, although the weight is greater, and strong roof timbers would be wanted to support them.

In country districts where good views are likely to be obtained, I must say I lean towards the flat-roof system, especially with the glazed structure over to keep the roof from blacks, but where this is not wanted, then I prefer the heavy tile, that when put in its place cannot be disturbed by wind or rain, and that you can rely on without fear of any damage.

Long ladders for getting on the roof should be dispensed with; every roof should have a door, and means should be contrived by which workmen should be able to get at all parts for examination or repairs.

It would be quite easy to make roof tiles in concrete, and to cast in them stepping-pieces, whereby any workman could reach any part of the roof without ladders; all these are matters of detail, which might be adopted or not, but I would lay down the principle that all roofs should be fireproof, the rafters being of iron, that no tiles or slates that would not bear the weight of a man, or that can be blown away by the wind, should be used, and that all parts of the roof should be accessible without the aid of long outside ladders, and if these matters were embodied in the construction of our roofs, I see no reason why they should require repairs from one end of the year to the other.

Chimneys.

The value of an upcast-shaft in every room is so great that I would have double the usual number of flues in every chimney-stack. For the division in flues, fireclay is an excellent thing: the object is that the heat of the smoke-flue shall warm the air in the adjoining flue, which should be an extractor to draw off the burnt and vitiated air from the room in which the fire is burning. The inlet should be near the ceiling, and I have found a slight turn in the bottom of the flue prevents the down-draught when the fire is not in use. It is also very handy to have an extra smoke-flue or so, and if it should be found advisable to divide a large room, or to put up a conservatory or other addition, the value of such extra flues will be found.

When the chimneys are being built it adds very little to the cost to put plenty of flues: they are no harm if not wanted, but if they have to be added afterwards the cost is a great consideration.

In exposed places chimneys should be kept in the inside of the house, especially the kitchen chimney and the rooms where fires are mostly kept; they will be found to draw much better than when exposed, and even in cold weather to warm the house and to keep up a circulation of air that is most desirable.

Chimneys are not usually made high enough above the roof, the higher a chimney the better it will draw, and the unsightly make-shifts, such as chimney-pots, would not then be required. The objection to a tall chimney is its liability to be blown over, but there are two ways of obviating this. The first is to make it much larger than is usual; extra flues, as I have already explained, may become very useful, and if not used are in no way objectionable.

Brickwork should always have a tie of iron when used for chimneys, at its junction with the roof; if a slight iron rod or gas pipe, or even a piece of stout hoop iron, was carried up at each corner of a chimney and built out in the brickwork, it would give the vertical tie that is required, and a chimney thus built could not blow down unless the iron on one side broke, and such a contingency is highly improbable, and by increasing the strength of the iron may be made impossible.

The mortar joint usually put is no tie at all, the weight of the brickwork is not sufficient to withstand sudden gusts, and all chimneys, especially if carried higher, as I would recommend, should have a vertical iron tie.

Heating and Ventilation.

Fire-clay is sweeter and more wholesome than iron, and open grates are better than stoves.

Shallow fires are more economical than deep ones, and fire-clay bottoms are better than iron gratings. It is a pity that there is always such a burnt-air smell with an iron stove, but there is no getting over it, wherever fire-clay can be used it will be found the best. Open grates should always be used for rooms, because they require a large supply of fresh air, owing to the rapid current up the chimney. This supply is drawn in through the chinks of the windows and doors, and so the air in our room is constantly changed. It seems curious, but although we should not build a stable without a manger, or chain up a dog without seeing that food and drink was within his reach, we construct a chimney to carry away the air and make no provision whatever for its supply; in fact, by tight-fitting doors and windows we do our best to prevent the fire getting any. The gas and the occupants all require a large supply of fresh air without any provision whatever being made for its admission.

Grates in the basement should have a hit-and-miss ventilator fixed on outside in connexion with the air-space under the floor; a similar ventilator should be put in the outer wall, so that a continual current might by this means be kept up.

There is no reason why appliances should not be provided in a newly-built house, by which means fresh air, either hot or cold, should be turned on to any room in the house. If people took half the care of themselves they take of their plants, it would add greatly to their enjoyment.

The simple law that regulates all heating and ventilation is,—hot air rises, cold air falls. By bearing this in mind, mistakes would seldom be made.

Every well-built house should have in its basement a warming apparatus. Any hothouse boiler or hot-air stove will do; some are better than others, but any will answer the purpose.

To supply this stove, one of the extra flues I have recommended for my chimney should be connected with it, and to prevent the smoke being drawn down the chimney-top should be closed, and a hole the size of the flue cut in the chimney-shaft near the top, by preference on the north side, with a grating over it to keep out the birds. This air is sweeter and purer than air near the ground. If the stove is a hot-air stove, the air simply passes through it, and is ready for delivery; if a greenhouse stove, a coil of pipes filled with water will be required.

Bearing in mind that cold air falls, the air in the shaft will readily be drawn into the hot-air chamber, and when warmed this same air will rise, and flow into any room of the house in which it may be wanted.

By utilising another of our spare flues, the air can be carried to the top of the house, and by having doors in the chimney-breasts to fall into the rooms, it can be admitted simply and inexpensively. This air should not take the place of grates in the rooms, but be merely an auxiliary supply; and in very cold weather, when air for the supply of the fire and ourselves must be admitted into our rooms, it is better that it should be warmed than cold, and will be found to make the entire room more comfortable, and free from draughts. It would be well to have an outlet from the warm air-chamber into the stairway, as, by raising the air in the stairs and passages to an equal temperature with the rooms, no draught will be felt on opening doors.

You may, perhaps, think I am somewhat fidgety about draughts, but a long-continued draught will kill any living thing; even plants placed in a draught will dwindle and die, and a dry house filled with pure air, and free from draughts, is as yet a desideratum.

Having now shown how a house in the winter time can be warmed, and having provided warm fresh air for ourselves, our fires, and our lights, with an extracting-flue to carry away the used-up air in the upper part of our rooms, we will now see how we can cool our rooms in the summer time, so as to increase our enjoyment all the year round.

It is usual to have in one of the rooms in the roof a water-tank for the supply of the house, into which water is forced when there is no water inside, or pumped where none exists.

I would have two of these tanks, one within the other, the inner one say 2 ft. each way smaller than the outer one. Suppose, for instance, the outer tank is 8 ft. long, 8 ft. wide, and 4 ft. deep; the inner tank should be 6 ft. long, 6 ft. wide, and 3 ft. deep; the outer tank would contain the water and the inner tank would be empty. Now, you will see by this simple means I get a volume of air much cooler than the ordinary temperature, and if cooler, therefore heavier, and if I cut a hole through the bottom of the two tanks and carry a pipe through the side of the flue, the cold air would so surely fall wherever it is carried, as the water in the tank will fall wherever it is led. This room should be connected with the spare flue and a grating near the top of the chimney-shaft, which we have provided to supply the fire with air in cold weather, and by reversing the action of our hot-air shafts, bearing in mind that hot air rises and that cold air falls, we can admit a stream of cooled air wherever we like.

In very hot weather the temperature of the water will be raised, and when most wanted it will act most sluggishly. To remedy this, blocks

* By W. H. Lascelles, Builder. See p. 621, *ante*.

of ice must be placed on iron gratings in the inner cistern, the air-pipe must come up higher than the bottom to prevent the water from the ice running down, and provision must be made to carry this water away, but as we have to provide fire in the bottom of the house to increase the circulation of the air in the winter time and to warm it at the same time, so we should provide ice in the summer time at the top of the house to cool the air and increase its circulation, because the hotter the air is the quicker it rises, or the cooler the air is the more readily it falls.

Cold air should never fall like water in a shower-bath, it should be made to rise on the principle known as Tobin's, and then fall over by its own weight; this will be the case if it is admitted into rooms by doors hung at the bottom and falling in at the top with side wings, the inward rush of the air will carry it towards the ceiling, when it will fall over without draught.

I think now I have shown it is practicable to make any room in a house as warm as you like or as cool as you like, and to do it with pure fresh air without blocking up the fireplaces or adopting any expedient that the most fastidious could object to.

If the appearance of the air-doors in the chimney breasts were objected to, a picture might be attached to them, and they would not be seen at all.

Drainage.

Keep all drain-pipes outside the house; ventilate them whenever you can, and flush them well.

The scullery sink should be drained into a tank just outside, with a cover to remove grease, a grating over the overflow, and a pipe to let off steam. The tank should be divided so that no connexion should exist between the waste-pipe from the sink and the overflow pipe from the tank, and by this means foul smells be brought into the house.

The waste-pipes should empty over gratings provided with traps, and never be connected directly with drains. The same rule should be applied to the water-closets, the soil-pipe should be carried to the top of the house, and be quite open to the air, and the bottom be provided with an inlet so as to get an up-draught, and by this means the D-trap can be dispensed with, and a current of air be always flowing through the pipes, keeping them clean and sweet; this method was the invention of R. Norman Shaw, R.A., and was first used in his own residence at Hampstead, which I built for him.

Let your drainage be simple; avoid all complications; have it all explained, and see you understand it before the workmen leave; if pipes are covered up, have the casings so constructed that you can remove them readily. The pipes for the water supply should be brought underground and up under the house, so that the frost can never get at them; have a stock-cock, and a draw-off tap where they enter the house, to turn it off and empty the pipes for repairs, alterations, or in very frosty weather.

Put lead safes under closets, baths, and up-stairs sinks.

Joinery and Decoration.

It seems a great pity when a house is newly built and a damp atmosphere pervades the whole place, to put in doors that are to last as long as the house, with the inevitable result that the wood will swell and be eased, until by-and-by, when all is dry, the doors will shrink, and as long as the house lasts be too narrow for their openings.

The same argument applies to the floors and the windows; the old-fashioned plan was to get the house built and the plastering done a year before the joinery was put in, but people will not wait now; and I really think if the floor were laid temporarily, or a double floor put, leaving the upper portion for a year, it would be a good plan. The same with the doors. If temporary doors were fitted, they could be used again and again, builders would keep them in stock, and the best doors be kept out until all was dry. I would fix temporary sashes in the best rooms on the same principle, for it is better to be put to a temporary inconvenience than to have to submit always to ill-fitting joinery-work.

As for decoration, it is a matter of fashion, for which no law can be laid down, and the best plan is to provide work that will lend itself to any kind of decoration that may be in vogue; for instance, I would not make the doors of hard woods, polished in the inside of the room,—a painted door is better, you can alter it as often as you like, and can, without great expense, get a new effect. I would have the walls plain for the same reason, and the panelled ceilings I have recommended, would lend themselves to any kind of decoration.

Now I have said my say, and I have, I hope, avoided all technicalities, and made the matter clear to any ordinary intelligent person. I would only add in conclusion that the theories I have laid down are not those of a dreaming enthusiast, but of a practical man, who has had experience of all he has written about, that many of the matters he advocates he has carried out, and that he has proposed nothing that there is any real difficulty in carrying into practice.

OBITUARY.

Mr. C. H. Elt, the representative of Islington at the Metropolitan Board of Works, died on Sunday, the 21st, after a very brief illness. Mr. Elt was present at the dinner given by the chairman of the Board, on Saturday last, to the members of the Board, and was there attacked by indisposition, which resulted in his death upon the following day. The deceased was elected a member of the Board in 1866, and took an active interest in the work of the Board. It was mainly due to his instrumentality that the open space formerly known as Hornsey-wood was secured to the public, and preserved as an open space under the name of Finsbury Park. Mr. Elt was a man of considerable literary ability, and took an active part in the great political movement which resulted in the passing of the first Reform Bill.

NEW BUILDINGS AT BAKERS' HALL.

An extensive range of new buildings is at present in course of erection at the Bakers' Hall, Harp-lane, Great Tower-street. A number of old structures belonging to the company, facing Harp-lane, which occupied the ground in front of the hall, have been cleared away, and on the site a block of new buildings is in progress. The buildings have a frontage of 92 ft. in length to Harp-lane, and are 40 ft. in height to the parapet, the extreme height to the ridge of the roof being 52 ft. The buildings consist of four floors and a deep basement. The windows on each floor, which are about 16 ft. in width, admitting a flood of light, are of three openings, divided by ornamental iron columns. Under the windows there are ornamental panels, and over the windows there are perforated rolled iron joists, which serve for ventilating purposes to the several floors. Up to a bold cornice, immediately above the ground-floor, the elevation is in Portland stone, the elevation of the upper floors being in red brick, with cornices over each floor in cement. In the centre of the new building there is an entrance to the hall, by a corridor 10 ft. in width. The entrance is flanked on each side by fluted piers and pilasters, the extreme width of the entrance-corridor and the piers on either side being 14 ft. The piers are surmounted by a pediment, with the Bakers' arms carved in the centre. Between the piers, over the ornamental iron entrance gates, is an arch, the spandrels being carved. The whole of the new buildings are intended to be let as offices, the upper floors being reached by an octagon, enclosing a circular flight of stairs, faced with white glazed brick. A court-yard between the new buildings and the hall itself is also faced with white glazed brick. The approach corridor to the hall, already referred to, from the rear of the new buildings to the steps leading to the hall-vestibule, is covered in with stained glass.

In addition to the erection of the new buildings the hall itself has undergone renovation, and new apartments have been added on the lower part of the south side, which was formerly an open space, the portion of the hall above resting on columns. This open space has been enclosed, faced with red brick and Portland stone, and contains additional apartments as the residence of the beadle. The basement of the hall has likewise been entirely re-arranged, and the culinary department improved by the introduction of modern apparatus. The whole of the roof of the hall has also been stripped, re-slated, and the gutters relaid. The estimated expense of the works is about 12,000*l.*

Messrs. Clarke & Shoppee are the architects, and Mr. E. Lawrence, of City-road, is the contractor. Mr. Merrifield is clerk of the works, and Mr. Tester the foreman.

EDINBURGH ARCHITECTURAL ASSOCIATION.

The annual general meeting of this Association was held on the 17th inst. in their rooms at 20, George-street, Mr. M'Lachlan, president, in the chair. After some new members had been balloted for and duly elected,

The Secretary submitted the annual report, which stated that, while at the beginning of the financial year the members numbered 116, there were now 139 names on the roll.

From the Treasurer's statement, it appeared that there was a balance in the bank belonging to the ordinary and life funds of 58*l.* 2*s.* 10*d.*, as compared with 30*l.* 15*s.* 7*d.* at the beginning of the session. The balance in hands of the Convener of the Sketch-Book Committee was 19*l.* 7*s.* 9*d.*

Mr. David M'Gibbon was elected president for the ensuing year; Mr. G. W. Brown and H. J. Blanc were chosen vice-presidents; while the present secretary and treasurer were re-appointed.

The Chairman then read a continuation of his "Notes on Some Old Edinburgh Architects." At the outset he complained of the oblivion into which the memory of architects was allowed to sink, the labours of whom had done much to render the world more beautiful. He then proceeded to review briefly the life and work of several well-known Edinburgh architects, beginning with that of William Burn. Referring to the abuse which that gentleman had received for his treatment of St. Giles Cathedral, he held that no man should be blamed for not being ahead of his time. At the time Mr. Burn altered St. Giles, the revival of Gothic art was in its infancy, and Burn was not more blameworthy in his treatment of St. Giles than Smirke and Wyatt were in dealing with the English cathedrals. The next spoken of was David Bryce, of whose power of applying classic art to modern requirements the Sheriff Court Buildings and the Bank of Scotland were pointed to as monuments. The other names taken up were Robert Reid, the architect of St. George's Church; James Gillespie Graham, the designer of the spire of the Assembly Hall on Castle-hill; John Henderson, Alexander Black, and David Cousin. The proceedings terminated with a vote of thanks to Mr. M'Lachlan for his paper, and for his conduct as president during his term of office.

RUSSIAN NEWS.

Notwithstanding its postponement from last year, the Russian Exhibition of National Industries follows the example of most other exhibitions in the backwardness of the preparations for opening it. The Finns have far outstripped their Russian neighbours in the earliness of their arrangements. Taking advantage of Eastertide, spent as a long holiday by the Russians, the Finns pushed forward their works ahead of the surrounding groups of exhibitors, and will be the first to have completed the instalment of their exhibits, upon the mounting and display of which they have been lavish of expenditure, decorating the cases and compartments with peculiar national designs and ornaments. They have, it is noted, kept the object steadily before them of preventing any confusion of their specimens with articles from other parts of the Empire.

Nine designs for a funeral monument to the architect and archæologist, A. V. Dalh, have at present been sent in to compete for the premium, which is to be awarded during this month.

The programme of the Commercial and Industrial Congress, to be held at Moscow, includes seven sections, viz.,—1, Factories and Manufacturing Industries; 2, Local Home Manufactures, and *Artels*, mutually-liable Co-operative Guilds; 3, Commerce; 4, Finance and Credit; 5, Roads and Ways; 6, Posts and Telegraphs; 7, Statistics and Technical Education.

We hear from St. Petersburg of an instructive instance of the fluctuations in trade and their causes. The results of the recent census showed that about 9,000 kvartiri (suites of dwelling apartments) were untenanted. Building activity at once declined, very few private speculations being undertaken. This depression caused such a fall in the price of builders' materials that enterprise was stimulated anew, and the building industry has begun to revive.

Preparations are in course for celebrating the hundredth anniversary of the union of the

Crimea with the Russian Empire, which is to be kept on the 3rd of April next year. In connexion with this event a new church in the old Chersonesus is to be consecrated; the iconostasis of the new temple is composed of marbles found among the ruins of the ancient city. A museum is also to be opened in Sevastopol, in which collections of local rarities and antiquities will be exhibited.

Subscriptions are being collected to form a fund bearing the name of the late well-known architect, K. A. Ton, former rector of the Imperial Academy of Arts, the interest of which is to be expended in gold and silver medals, which will be awarded for the best architectural work in the Russian style.

Archimandrite Ignatius, the Superior of the Sergievskaa Poustyna, has completed designs for the church to be built on the spot where the late Emperor was assassinated. The plan is said to correspond in all respects to the requirements named for the competition. It should be added that Archimandrite Ignatius, while a layman, was a pupil of the celebrated artist, Brulof.

The newspapers not long ago contained telegrams of reported discoveries of Nihilist mining operations beneath the Moscow Kremlin and the Ouspenskoï Cathedral. Such rumours have been rife in the atmosphere of Moscow for some time, and only received an impulse from a circumstance observed in the Kremlin, near the Chudof Monastery, where the pavement one day showed a singular depression. Of course, this was sufficient, especially in the present state of uneasiness, to excite many suspicions. Excavations were ordered, to discover, if possible, the secret mine. Nothing of this kind was, we believe, found. But the investigations were not without a result of some archæological and architectural interest. The depression in the ground had resulted from some of the stones in the vaulting of a subterranean chamber having fallen in. The chamber thus brought to light is built of hewn stone, is about 23 ft. long by 12 ft. broad, and 15 ft. in height. Its eastern wall has a recess in which there is the embrasure of a window, which is arched with brick. Mortar has been employed in all parts. Nothing was found in the interior of the chamber, which is referred to the date of the sixteenth century by MM. Zabyelin and Roumyantsef, who consider it may have formed part of the house of Boris Godunof, and must have been situated on the side of a street, 23 ft. broad, extending from it towards the Chudof Monastery.

One of the coronation gifts to be presented to their Imperial Majesties the Emperor and Empress of Russia,—an offering from the town of Yaroslav,—will be of interest to the readers of the *Builder*. It is a model, the work of M. Smirnof, of the fine seventeenth-century church of St. John Baptist at Yaroslav. This edifice is surmounted by no fewer than fifteen gilt cupolas, and is further remarkable for the display of bright colour, effected by the copious employment of encaustic tiles in its construction. There are models also of other productions of M. Smirnof's, viz., models of the Imperial House at the Ipatyef Monastery, the celebrated Spasskyi Gate of the Kremlin at Moscow, and the Church of Vasili Blazhennoi in the same city. This last church is a most curious and peculiar structure. An omniscient correspondent of one of our great "dailies," some months ago, drew attention to it, as a typical example of Russian architecture. This, however, is exactly what it is not. The building differs radically from Byzantine and Russian edifices, and has distinct affinities with Indian architecture. Many of the ornaments and decorative details, too, are considered by many competent persons to be borrowed from the temples of India, and some time ago documents were brought to light which seem to prove that the architect had visited that country, or at least had relations with it. The matter is one of considerable interest, and our correspondent hopes to tell us something more about it on another occasion.

Mrs. E. M. Ward's Studio.—On Tuesday last Mrs. E. M. Ward gathered together in her studio, 6, William-street, Lowndes-square, the productions of her more advanced pupils for the pleasure and satisfaction of their friends. The exhibition included some very excellent work, and did credit alike to the pupils and their instructors. It was agreeable to hear that the studio is fully attended.

A VISIT TO TERRA-COTTA WORKS.

On the 17th inst. the members of the Manchester Society of Architects, including some of the leading practitioners in the city, paid a visit to the Pen-y-bont Brick, Tile, and Terra-Cotta Works, at the invitation of Mr. J. C. Edwards, the proprietor.

The party was accompanied to Ruabon by Mr. Andrews, the Manchester agent to the firm, and were conducted through the works by Mr. J. C. Edwards and his son; Mr. Bryon, manager; and Mr. Richardson, surveyor to the works.

They were first taken to the pit to view the bed of clay in its natural state, and were then shown the various patent processes by which the clay is ground, moistened, pressed, and fired, until it is transformed into red, blue, and brindled bricks, terra-cotta, and roofing and ridge tiles, tesselated pavements, and glazed and encaustic tiles, &c.

The Pen-y-bont bed of clay is believed to be of the finest description; and the works have been raised to their present magnitude by the energy and enterprise of Mr. Edwards. They find employment for nearly 500 men and boys. They occupy a position of great natural beauty, facing Robertson's well-known viaduct and the lovely valley of Llangollen.

Great interest was taken in the different manufactures, particularly in the terra-cotta and encaustic tile departments.

THE WEST MIDDLESEX WATERWORKS.

NEW RESERVOIR AND FILTER-BEDS.

On the 18th inst. Major Boileau, chairman of the West Middlesex Water Company, accompanied by the directors and a large number of visitors, opened a new reservoir and two filter-beds which have just been completed on the company's land at Barnes, near the Surrey end of Hammersmith Bridge. It may be observed that although the West Middlesex Company does not supply water to any houses on the Surrey side of the Thames, it has a large tract of land, 76 acres in extent, bordering the river on that side, and extending from Hammersmith Bridge to Barnes-terrace. The intake is at Hampton, whence the water is pumped through two 36-in. pipes as far as Richmond, where these pipes are carried beneath the bed of the river, and one of them is continued on to the reservoirs at Barnes. The company is now continuing the second of these 36-in. pipes from Richmond to Barnes, this and other works about to be described having been necessitated by the constantly increasing demand for water supply in the vast district served by the company. The water from the intake is received into the reservoirs at Barnes, whence it is passed through the filter beds, and thence through two 36-in. mains passing beneath the bed of the river to the pumping station at Hammersmith, whence it is sent into the supply mains. Here in the old buildings there are in use six Cornish engines having a total of 1,035 horse power. An additional engine-house has lately been erected, large enough to contain three more engines of 150 horse power each. One of these was started about a month ago, and the second is fast approaching completion, but it is not proposed to put in the third engine until demanded by the further development of the district. The two new engines have been made by Messrs. Simpson & Co., of Grosvenor-road, and are of the compound beam type. These new works at Hammersmith are not included in the contract of which we make mention further on. The company has other reservoirs and small pumping stations in distant parts of its district. Out of a total of 59,263 houses at present served by the company, 9,600 houses are supplied on the constant service system, which is being gradually extended in the older parts of the company's district, and enforced in all new buildings. Touching the quality of the water, we may say that, according to the report on the composition and quality of daily samples of the water supplied to London for the month ending April 30th last, presented to the Board of Trade on the authority of Mr. William Crookes, F.R.S., Professor Odling, and Professor Meymott Tidy, of twenty-two samples taken from the mains of the West Middlesex Company, "the whole were found to be well-filtered, clear, and bright." The average quantity of oxygen required to oxidise the organic matter in the samples taken is stated on the same authority to be 0·034 grain per gallon, while the quantity of free oxygen in solution was found to be 2·07 cubic inches per gallon.

We will now proceed to describe the new reservoir and filter-beds at Barnes, where, prior to the completion of these new works, there were three large reservoirs and about eight acres of filter-beds. The new reservoir has an area of seven acres and a half at the level of its greatest water surface, and has a capacity of 24,000,000 gallons. The three pre-existing reservoirs have a total area of 29½ acres, and have a capacity of 91,750,000 gallons; so that with the reservoir just completed there is a total storage capacity of 115,750,000 gallons. The new reservoir is partly excavated and partly embanked, with a puddle trench 3 ft. 6 in. wide all round it, going down and stepped into the London clay. The bottom of the reservoir is also, of course, puddled, the whole of the surface with which the water will come in contact being (with the exception of 12 ft. or 13 ft. of the upper part of the slope all round) covered with a layer of Portland cement concrete, 6 in. thick, and very well executed. About 11 ft. of the upper part of the interior slope of the reservoir is surfaced with Staffordshire blue bricks, specially made for the purpose by Mr. Joseph Hamblet, of West Bromwich. These bricks are glazed or vitrified on the flat, and are laid edge to edge in cement, the object being to obtain greater covering power with the same number of bricks than could be obtained by laying the bricks in the usual manner. Above this broad band of Staffordshire blue bricks (the purpose of which is to prevent abrasion of the surface of the reservoir by the action of the water in windy weather) a few courses of Staffordshire blue bricks, laid in the usual manner, are carried up vertically, and capped by bull-nose coping bricks, of blue Staffordshire ware, and supplied by Mr. Hamblet, who also, as manager of the Aylesford Pottery Company, supplied the square-section pipes used beneath the two new filter-beds. These filter-beds have a total area of 2½ acres, and are constructed on a new principle. The whole of the floor of the beds is laid with earthenware pipes, each 12 in. long, and each being 2 in. square internally and 3½ in. square externally, so that they are ¾ in. thick on all sides. They are very accurately and well made, the ends being made to butt joint with each other. These pipes, of which about sixty miles' aggregate length are used in the new filter-beds, are laid quite close together all over the bottom of the beds, so as to form a series of continuous small tunnels, parallel to each other, for conveying away the filtered water. No perforations, it should be said, are made in the tubes, the water finding its way through the joints which occur every 12 in. in the pipes. These pipes having been laid, they are first of all covered with a 6-in. layer of well washed and screened pebbles, each of about the size of a bean; this layer is succeeded by another of the same thickness, but formed of smaller pebbles, each of about the size of a pea; upon this is placed a layer of sand, 2 ft. 6 in. thick, and this sand is, of course, washed and cleaned as occasion may require. The water, having passed through the layers of sand and pebbles, finds its way through the joints of the square tubes, and by them is conducted into channels or conduits leading to large well-holes or sumps, whence it is drawn away for distribution by the pumps.

Another very noticeable feature of the new works is the method adopted by their engineer for filling the new reservoir and filter-beds, so as to aërate the water as much as possible. The 3 ft. main leading from the intake,—or rather from a storage reservoir near Barnes-terrace fed directly from the intake,—is carried full-bore a little way into the reservoir, and supported on brick piers. It is then curved upwards until it attains a vertical position, and at a point about 2 ft. above the highest water-level of the reservoir is made to support, and to pass through the centre of, a large iron disc or "splash-plate," 11 ft. in diameter. The main is continued up for a height of 4 ft. above this splash-plate, gradually expanding like a bell-mouth, until at its termination it has a diameter of 4 ft. 6 in. When the water is being admitted to the reservoir, it falls, cataract fashion, over the top of the bell-mouth all round on to the disc or splash-plate, whence it has a further fall, varying with the height of the water-line, into the reservoir. This contrivance is obviously of great service in aërating the water. A modification of the same expedient is used for filling the new filter-beds.

The whole of these works have been executed

in an excellent manner by the contractors, Messrs. John Aird & Sons, and their total cost, including the enlargement of an existing reservoir and some other works not mentioned, will be about 60,000*l*. (This is altogether exclusive of the outlay at the Hammersmith pumping station.) The works have been designed by and executed under the supervision of the engineer to the company, Mr. Thomas Hack, M.Inst.C.E., who expresses great satisfaction with the Staffordshire blue bricks supplied by Mr. Hamblet, and with the square pipes supplied by the Aylesford Pottery Company. From the foregoing necessarily brief description it will be seen that the works now completed possess some points of special interest.

STONE-WORKING BY MACHINERY.

The working of stone of all kinds for building purposes by suitable machinery is a matter which largely engrosses the attention of master-builders and contractors, and as one of the most useful and economical machines, the rubbing-bed or surfacing-machine, has of late years come into peculiar notoriety. The saving in time and labour by the use of these machines is a fact beyond dispute, and the increasing favour in which they are held is demonstrated by the call for larger machines. When first introduced, machines of this description, with revolving tables of 7 ft. 6 in. or 9 ft. diameter were, for the most part, employed. Then, when their utility had been fully established, and large contracts, such as the new Law Courts, required an immense quantity of stone to be manipulated, machines with tables of 11 ft. diameter were required. This was again increased to 13 ft., of which size many machines have been made during the last two years.

More lately a 13-ft. machine with the large rubbing surface which it presents is found insufficient, and Messrs. J. Rotherce & Co., of King William-street, have just completed a machine with a table 14 ft. diameter for one of the largest stone-merchants in London. This is, we believe, the first machine of so large a diameter that has been manufactured, and it is satisfactory to know that the trial has been quite successful. Means are employed to secure the greatest steadiness and truth when revolving; and the quantity of rough stone that can by this means be surfaced to a perfectly even finish places the stone-rubbing bed in the forefront of masons' machinery.

BOYLE'S SYSTEM OF VENTILATING SHIPS.

As we announced a week or two ago, Messrs. Robert Boyle & Son, of the Holborn Viaduct and Glasgow, were awarded the prize of 50*l*. offered by Mr. ex-Sheriff Burt for the best system of ship ventilation exhibited in connexion with the Shipwrights' Company's very interesting and valuable Exhibition of Ship Models recently open at the Fishmongers' Hall. We append a few notes explanatory of the system, which has the great merit of being automatic. To properly ventilate any apartment, whether it be a theatre or the saloon of an ocean-going steamer, provision must be made for the inlet of fresh air as well as for the exit of foul air. Ventilation in its true sense cannot be effected by the omission of either of these *desiderata*, although it is often attempted. Messrs. Boyle, as ventilating engineers of experience, have, it is needless to say, steered clear of any such mistake or omission, and their system of ship ventilation provides both for the inlet of fresh air and for the exit of vitiated air. The fresh air is admitted by their patent down-cast ventilators, standing well up from the surface of the top deck, and, by preference, to the fore of the extraction shafts, so that the passage of the vessel across the sea may as far as possible be made to aid in the work of ventilation. The mouths of the down-cast ventilators are constructed so as to readily deflect and direct downwards with some velocity the air impinging upon their interior, and the air thus deflected is carried downwards and forwards through main trunks or pipes, disposed as occasion may necessitate, and tapped at intervals by vertical tubes with open ends some 4 ft. above the level of the floor of the saloon, engine-room, or other part of the ship. The mouth of Messrs. Boyle's down-cast ventilator, as applied to ships, is ingeniously constructed so as to allow of the immediate escape (through a series of louvres) on to the deck of any rain or sea water that may find its way down the mouth of the ventilator. These inlet ventilators, it may be stated, are fixtures, have no movable parts, are perfectly water-tight, and can be kept in action in any weather. So much for the means taken to supply fresh air to the various parts of the interior of a ship. It only remains to be said that the extraction of the vitiated air is effected by means of Messrs. Boyle's self-acting air-pump ventilators, fixed above the deck, and directly communicating by shafts with openings made in the ceiling of the saloon or other parts of the ship. These air-pump extraction ventilators possess the great merits of being fixtures, having no movable parts; of being capable of producing and maintaining a powerful up current, whatever may be the direction of the wind; and of being free from down-draught, owing to the arrangement of the louvres. With these extracting ventilators fixed abaft the inlet ventilators, the circulation of air into and out of the ship is naturally facilitated by the passage of the vessel. The system is applicable to both sailing vessels and steam vessels, but is particularly adapted to steam vessels, as the rapid motion of the latter is calculated, even in calm weather, to cause a plentiful and continuous supply of air to impinge against the mouths of the inlet-ventilators, and to be carried down into the ship, while, at the same time, the effectiveness of the air-pump or extracting ventilators will be increased.

Messrs. Boyle's system of ventilating ships is but an adaptation, with one or two necessary modifications, of their system of house ventilation. It is, we should say, likely to come into extensive use, and has already, we understand, received the favourable notice of many distinguished experts and authorities in shipping and naval matters, including H.R.H. the Duke of Edinburgh.

ENGINEERING IN SUFFOLK.

The following letter, with stamped envelope for reply, has been sent to us in perfect good faith. We omit the writer's name; it is the system, not the persons, we object to:—

Sir,—I am a farmer deputed by the parish to superintend the building of a bridge (in lieu of old one) across a river the bottom of which is a bog.

Can I do better than devise an arch of semi-circular form? I would not mind sending 2*s.* 6*d.* for the best kind of drawing for such purpose. It requires to be 11 ft. span, rising not more than 4 ft 6 in. Some years ago (twenty) I was very successful in constructing a break-water of 10 ft. fall on a pure sand, which has stood the floods since. Perhaps you can direct me to some book of drawings.

I am not a regular subscriber to your paper.

Badingham.

THE GRECIAN THEATRE FOR SALE.

On Monday last the lease of the well-known East End theatre the "Grecian" was offered for sale at Masons' Hall Tavern by Messrs. Tabernacle & Co. The sale included the Eagle Tavern, together with the Assembly Rooms, ball-room, and pleasure-grounds attached, the whole of the property occupying an area of about one acre. The theatre was rebuilt only a few years ago, a view of the interior of the building appearing in the *Builder* at the time. It was stated that the auditorium is capable of accommodating 5,000 persons, exclusive of eighteen private boxes. All the scenery and fixtures of the theatre and the grounds, except the refreshment-bars, were included in the sale. The whole of the premises were said to be held for terms expiring in September, 1898, at rentals amounting to 365*l*, but it was explained that the underlettings amounted to 441*l*., showing an annual profit rental. These underlettings were stated to consist of the stables, billiard-room, gallery in the theatre, weighing-machine, and shooting-gallery, and the cash taken in the cloak-room, this last item being set down at 144*l*. The particulars stated that the vendor, if desired, would take from the purchaser an under-lease of the theatre and ball-room in the rear, at a rental of 1,000*l*. a year for the remainder of the term, the purchaser to have the exclusive right of supplying all refreshments, and the vendor undertaking to keep the theatre and ball-room open during the term of the under-lease. The auctioneer, in introducing the property, adverted to the great success which had uniformly attended the management of the theatre, for many years past, under the proprietorship of the Messrs. Conquest and others, observing that Mr. Clark, the present proprietor, and now the vendor, had been equally successful. The biddings commenced at 12,000*l*., and by advances of 1,000*l*. and 500*l*. each the property was brought up to 18,000*l*., when the biddings stopped, on which the auctioneer said the property could not be sold for that sum. It was then withdrawn, the auctioneer naming 21,000*l*. as the reserve.

REGENT'S CANAL AND DOCKS RAILWAY.

On Tuesday, after an investigation which occupied seventeen days, the Select Committee of the House of Commons declared the preamble of this Bill proved. In sanctioning the undertaking the Chairman announced that the Committee had decided that in constructing the railway no part of the waterway of the canal should be interrupted for more than ten days at a time, and that no such interruption should occur more than twice in one year. The Committee further stipulated that the waterway was to be kept open for the full twenty-four hours daily, with the exception of Sundays. The Committee also made it a condition that the tolls on the canal should not exceed those actually taken during the last twelve months, and they were, from time to time, to be subject to the revision of the Board of Trade, and the Railway Commission.

It was stated in the committee-room that the cost of the seventeen days' inquiry will amount to about 10,000*l*., of which the fees paid to the formidable array of counsel engaged, and the several eminent engineers who appeared to give evidence for and against the Bill, will form a considerable proportion. The cost of the undertaking is estimated at 8,000,000*l*., or about half a million per mile.

A RESPECTED CLERK OF THE WORKS.

We mentioned briefly last week the premature death of Mr. Jas. Bubb, the clerk of the works at Truro Cathedral: he had but reached his 39th birthday. The burial took place on Saturday in last week. His aged father from London, and three sisters, followed him to his last resting-place; and, headed by the Lord Bishop, so did almost the whole of Truro's inhabitants, all mourners in the true sense of the word. The cathedral choir assembled in their robes, and sang two hymns over the coffin as it lay, not many yards from the corner stone laid two years ago. Then, the Bishop spoke some suitable words to the 110 cathedral workmen, who, all arrayed in white aprons trimmed with black ribbon, stood around. In the cemetery the service was read by Canons Mason and Harvey and Chancellor Whitaker, the Lord Bishop pronouncing the benediction. Canons Phillpotts and Vautier, as well as ten other clergymen, were also present in their robes; and amongst the mourners were Mr. Pearson, R.A., Mr. Shillitoe, the contractor, and Mr. T. Shillitoe, Mr. Harry Hems, and others. The coffin is of oak, and was hidden by the wreaths of flowers laid upon it. Mr. Bubb had been in the service of Mr. Pearson from boyhood. Amongst the principal works he had carried out is a church at Speke, near Liverpool; St. John's Church, Red Lion-square, Holborn; and St. John the Baptist Church, Dartington, Devon. Mr. Robert Swaine, who has been acting at Mr. Pearson's new Church of St. John, Norwood, opened on Monday last (May 22), will take Mr. Bubb's place. The choir is now built up some 25 ft. to 30 ft. above the nave floor-line.

The Bute Docks, Cardiff.—The preamble of the Bute Dock Bill has been proved before a committee of the House of Lords. The profits of the docks during the last twenty-seven years have only been 3½ per cent., but the value of Lord Bute's land in the vicinity of the docks has been increased to a fabulous extent. The present lord and his father have (according to the *Mining Journal*) spent two millions and a half of money on the docks, and it is proposed to spend another 500,000*l*. on the Roath Dock, for which powers are now being asked to enable the work to proceed.

BUILDERS' BENEVOLENT INSTITUTION.

THE fifty-seventh election of pensioners on the funds of this Institution took place on Thursday, the 25th inst., at Willis's Rooms, St. James's, Mr. Thomas F. Rider, vice-president, in the chair. For the four vacancies which existed there were six candidates, whose names, and the number of votes they received, were as follow:—William Adams, aged 62, 340 votes; John Cooper, aged 79 (second application), 1,672 votes; Robert John Datton, aged 60, 175 votes; James Keyes, aged 77, 988 votes; Jonathan Parsons, aged 67 (second application), 986 votes; and Charles Wood, aged 60, 209 votes. The successful candidates were therefore declared to be Messrs. Adams, Cooper, Keyes, and Parsons. Votes of thanks to the scrutineers, checkers of votes, and chairman, were moved, seconded, and adopted, the gentlemen taking part in the proceedings including Messrs. Thos. Stirling, T. G. Smith, W. Scrivener, — Head, and Cruttenden.

STREET VENTILATION.

SIR,—I observe that in your issue of the 13th inst. some very simple and well-recognised principles as to the necessity of arranging streets, where practicable, so that they shall be well ventilated, are founded upon some alleged statistical facts as to the prevalence of heart disease and dropsy in certain conditions, which are of a much more doubtful character. Most persons who have any practical acquaintance with returns of deaths, especially in large districts, where opportunities exist for comparing the values of these documents, know how utterly unreliable are the statements which they contain as to these two causes of deaths in particular. Apart from the considerations that dropsy is in all cases only a collateral symptom, and never a primary cause of death, that both it and heart disease may be due to a variety of causes, and that the term "heart disease" is itself so vague as to have no definite value at all, it is within my own experience at least that the use of these terms is very much a matter of intellectual idiosyncrasy on the part of the certifying doctor. Some doctors see heart disease in most of the persons they attend, especially in the case of elderly people, whilst others are more discriminating in their diagnosis, and look behind the heart symptoms to their causes. Hence it may happen that in the same locality the death certificates of one doctor might indicate an alarming prevalence of heart disease, whilst those of another would show only a normal quantity. How utterly absurd, then, it is to attempt to base any trustworthy generalisations upon such unsubstantial foundations as these. I have no hesitation in saying that any inferences as to the prevalence of heart disease or dropsy drawn from the records of mortality as they are available at present, are not worth the paper on which they may be written.

A MEDICAL OFFICER OF HEALTH.

LOCAL GOVERNMENT BOARD APPOINTMENTS.

SIR,—Will some one kindly inform me whether a Local Board have the power to appoint a clerk of works on sewerage works, and whose appointment has to be verified by the Local Government Board, without the appointment being duly advertised; or whether it is competent for a Local Board to appoint any one, and in any manner (as a clerk of works) they may please, and at the high salary (for a town of 5,000 inhabitants) of three guineas per week, well knowing that the person appointed has private practice as an architect and surveyor in two places, as well as another public appointment.

Also whether, when a member of a Local Board gives notice that at the next monthly meeting of the Board he shall propose the name of a certain person for the appointment of clerk of works, at a *special* meeting a fortnight after notice had been given, the Board can legally make such appointment, and thus frustrate the intentions of ratepayers from protesting against such an appointment being made without a person being advertised for to devote his whole time to the duties required?

J. R.

The Prince and Princess of Wales have kindly consented to open, on the 26th of June next, the Convalescent Home for Poor Children, which has been erected on West Hill-road, St. Leonard's-on-Sea. Messrs. Fowler and Hill are the architects, and Mr. C. Hughes, of St. Leonard's, is the builder.

GARSTON WESLEYAN CHURCH, BANKS ROAD.

NEW premises being required, the trustees requested the architect of their old building to compete for the new building with the "Inspector of Nuisances" to the Local Board, which distinction the former having declined, plans by the latter were at once accepted, together with estimates, amounting to nearly 1,400*l.*

The following memoranda from the plans, &c., will be enough to give an idea of the proposed structure:—Proportion of church very short. Transepts (the entire width of the site) deep and narrow, and what are called the "isles" 3 ft. wide. Schoolroom behind the chapel only 29 ft. by 20 ft., and yet 26 ft. high, whilst the span of the roof is lengthways to the room, and the light only from a dormer at each end, the cills of which are about 14 ft. above the school floor. Infants' room adjoins the schoolrooms, and has large folding door or screen between, the windows on one side opening principally into the boiler room, the upper portion only being free to the light and air. There are also six small classrooms and keeper's cottage, three of the former entered only from the schoolroom, and two lighted from the roof; class-rooms and schoolroom alike being entered from passages but 3 ft. wide, and some of the inner doors are to have one or more steps in the openings. What, however, is very remarkable as emanating from the Local Board's "Inspector of Nuisances" is the fact that all the school-yard and W.C. space consists of passages 3 ft. wide or thereabouts, an arrangement eminently calculated to secure the permanent attention of the official in question.

ARCHITECT.

PROVINCIAL NEWS.

Preston.—In the course of last year the Manchester and County Bank purchased a site for a new bank in Church-street, nearly opposite the Town-hall, adjoining the Legs of Man Hotel, and extending some distance down Mainsprit-weind. The designs for the new building have been prepared by Messrs. Mills & Murgatroyd, architects, of Manchester. The building will cover about 400 square yards of land, and will have a frontage of 41 ft. 6 in. to Church-street. It is intended to provide not only apartments for the business of the bank, but also a residence for a clerk or caretaker: hence the main front will be three stories towards the street, and carried to a height of about 48 ft. above the footpath. The style chosen is late Tudor, verging on Jacobean. The contract for the building has been let to Messrs. R. Neill & Sons, of Manchester. ——The new County Offices are approaching completion. They are intended to provide requisite accommodation for the several departments of the clerk of the peace, the treasurer, the auditor, and other officials engaged in county business, besides the several offices for these departments. The buildings in course of completion have a frontage towards Fishergate of 57 ft., and towards Pitt-street of 152 ft., exclusive of an adjacent small building in that street intended for a residence for a caretaker. Including this building and an intervening gateway, the extent of frontage in Pitt-street is 184 ft. Towards Fishergate the façade is continuous, and groups with that of the head-quarters of police. The Pitt-street façade is similar in character, but somewhat differently treated. The character of the design is a modification of the style prevailing in this country in the reigns of Elizabeth and James I., partaking rather of that known as Jacobean than of that of the earlier period. It is simple in detail, the external faces of the wall being of red pressed brick, with stone strings, cornice, window-quoins, mullions, and other dressings. In order to utilise to the greatest advantage the area of ground afforded by the site, an open inner court is formed, around two sides of which offices and other apartments are grouped. On the first floor a court-room is provided, 62 ft. by 45 ft., and 36 ft. high, with an open-timber roof in character with the style of architecture of the building. The court is lighted by a lantern-light in the roof, and by large windows with semicircular heads, having stone mullions and transoms. These it is proposed to glaze with lead-lights of suitable design, containing some heraldic glass by Messrs. Shrigley & Hunt, to whom it is intended to entrust the decorations of the walls and the roof of the court. The floors of the corridors and the record rooms are carried on brick arches, the corridor floors being laid with marble concrete of a grey tone by Mr. Oppenheimer. The court and the corridors are warmed by hot-water pipes, the apparatus in use being that of Messrs. Metcalf & Dilworth, of Preston, with their patent boilers. Mr. John Walmsley, of Preston, is the general contractor for the erection of the building; Messrs. David Tullis & Son have done the mason's work as sub-contractors to Mr. Walmsley; Messrs. Walmsley & Co. have done the plumbing, plastering, &c., also as sub-contractors. The furniture for the building is being provided by Messrs. Bell & Coupland, of Preston. The total expenditure on the County Offices will be 25,000*l.*, of which 2,500*l.* is for the land. The Constabulary Offices cost 19,000*l.* Thus the cost to the county of the entire block is 44,000*l.*

Chard.—At the quarterly meeting of the Chard Town Council, the mayor (Mr. Sumner Toms) proposed that a Corn Exchange should be provided for the town. He anticipated that the corn dealers and those interested in the sale and purchase of corn would receive the proposal with thanks, and the market would be thereby much improved. A movement is on foot with the corporation to build a large public hall for the town, which will be utilised for all public purposes, and the cost of which will be nearly 1,000*l.* The proposed Corn Exchange will be built in connexion with the same scheme, a committee being appointed to obtain plans and specifications, &c.

Books.

Die Sicherheit der Person im Theater. By Prof. A. PROKOP. Brünn: R. M. Rohrer. 1882.

THIS is a reprint, in pamphlet form, of a series of articles which appeared originally in the *Œsterreichische Verbands-Feuerwehr-Zeitung*. The safety of theatre-goers is first generally treated, and a great deal that has been said by M. Fölsch and others on the subject is here repeated. The practical part of the pamphlet, dealing with the construction of theatres, also travels over much of the same ground. The little work is a good *résumé* of all that has been written on the question. It includes a number of plans and sections of existing theatres, together with details of iron curtains.

Miscellanea.

Suggested Duplex Bridge over the Thames.—Last week a number of gentlemen assembled by invitation at the offices of Mr. Grace, Nicholas-lane, Lombard-street, for the purpose of inspecting the model of a patent duplex bridge proposed to be erected over the Thames east of London Bridge. The plan is substantially the same as was shown a few years ago when the question was before the public. Such a bridge would, it is urged, insure uninterrupted continuity of vehicular and general traffic, at the same time affording facility for passing the largest ships and steamers with highest masts to and from the wharfs between it and London Bridge. The vessels would be admitted at either end, whilst the road-traffic would be diverted only for a few moments, when the swing portion of one end of the structure would be opened or closed; but in no case would the traffic be stopped; and even a diversion would be comparatively rare, as it was stated that the average number of ships which would pass during the day was not above sixteen. The height of the bridge above high-water mark would be 29 ft. 6 in., the roadway would be 50 ft. wide; the gradients on the north side 1 in 100, on the south side 1 in 35 at present, but when Bermondsey improvements are effected will be about 1 in 45. The material is proposed to be iron and steel. The width of the waterway for high-masted vessels would be 50 ft. or more, up to 70 ft. if required; the length between the swing-bridges would be 300 ft., but would admit longer vessels; the height of the bridge at high water, under any navigable part, would be about 29 ft. The cost, it is estimated by competent persons, would be under 400,000*l.*, including the bridge and its approaches.

International Electrical Exhibition at Vienna.—It is proposed to hold, this autumn, an electrical exhibition at Vienna, the Rotunda, in the Prater, having been placed by the Austrian Government at the disposal of the influential committee which has been formed. The leading electricians of Austria, Belgium, England, France, Germany, and Holland, have promised their support. A member of the Vienna committee will shortly arrive in London to make the necessary arrangements with intending English exhibitors.

Society for the Encouragement of the Fine Arts.—A lecture, by Dr. Phené, on "Historical Outlines traced in Early Art Symbolism," was delivered at No. 9, Conduit-street, on the 25th of May. The lecturer approached his subject in the first instance by illustrations of art symbolism in connexion with recorded historical events. Taking a few letters of several Oriental alphabets, and showing from their original names and forms that they were merely the outlines of weapons, or pastoral or domestic objects, names of trees, boats, &c., he proceeded to point out that the indications they gave of warlike, pastoral, maritime, arborescent, or other occupations of the people using such alphabets, were supported by historical accounts of those nations. Thus, the Assyrians were warlike, the Egyptians contemplative, the Phœnicians were navigators, the Irish dwelt in primeval forests, &c. Taking a secondary view of the same letters, he showed how they represented the forms and emblems of their deities, and, in some cases, of their worship. Thus the circle would be the sun, the eye of God, and eternity, the great O (Ω), A (Aleph) representing a head of horned cattle, became the horns of Astarte or Isis, and followed by B (Beth), the house, became Beth-el, the House of the God, &c. The hieroglyphics, as indicated by the name, represented the objects of worship in animal, vegetable, and mythological existences, astronomical, and probably other scientific formulæ. Passing on to their architecture, he showed the sedate, sombre disposition of the Egyptians in their heavy style and gloomy retreats, telling throughout of the tomb; and the daring aspirations of the Greeks. These features exhibited the characters of each people.

The London Unemployed.—The Committee in course of formation for the benefit of the unemployed in London met in conference on the 22nd of May, at the Cannon-street Hotel. Lord Thurlow occupied the chair. Some twenty fresh letters of sympathy from gentlemen of position were laid on the table, and ten fresh names were added to the Committee, including three peers and three members of Parliament. Lord Thurlow made some remarks on the condition of the masses, and pointed out at best the impossibility of this country feeding its own people by home produce. Emigration was, he said, the only cure, and he was in favour of State emigration, but feared that it would not be brought about yet. His opinion was that a self-supporting association would work well, and he was studying a scheme which he hoped soon to submit to the Committee. His communication with the Canadian Government was highly satisfactory. Several clergymen and ministers having spoken, the Committee adjourned until after the Whitsuntide holidays.

Proposed New Workhouse Accommodation for the Holborn Union.—Allusion has lately been made to the extremely unsatisfactory condition of the old buildings of the Holborn Union in Gray's Inn-road. We now learn that a meeting of the General Purposes Committee of the whole Board of Guardians has been held, at which Mr. H. Saxon Snell, the architect, submitted plans which were approved for the erection of new buildings at the City-road workhouse, to provide accommodation for 528 inmates at a cost of 15,840*l.*, and a dining-hall to hold 650 at a cost of 3,000*l.*, making a total of 18,840*l.*, exclusive of the furniture, &c., but the sudden break-up of the Board at their meeting last week,—a break-up resulting from "a scene" of great disorder arising through a personal matter,—prevented the subject from being brought forward.

Lead Poisoning.—Dr. Rennert, of Frankfort, has been making investigation into the hygienic condition of eleven families, with seventy-nine children, living in a village in Hesse, where the larger part of the inhabitants are employed in the glazing of earthenware, and who suffer largely from chronic lead-poisoning. He attributes to this cause the high mortality, amounting to 50 per cent., of the children during the first five or six years of life; the survivors suffer from hydrocephalus, an enormous size of the head.

Radcliffe.—The Co-operative Society is now engaged in extending their boundaries by erecting a new branch store at Chapelfield. They are also about to build fifty new houses, which they will sell to their members on deferred payments. The architects are Messrs. Maxwell & Tuke, of Princes-street, Manchester, who erected the central store a few years ago at a cost of over 13,000*l.*

Remarkable Charge of Fraud.—At the Highgate Police Court, Mr. James Wesley Reed, calling himself an architect and surveyor, of Tollington Park, Hornsey-rise, was charged with obtaining 17*l.* from Mr. Henry Cooper, builder, of Finchley, on the pretence that Mr. Cooper was employed by him, as agent for one Williams (whose Christian name the defendant said he did not know), to build a house at Barnet for 1,363*l.*, whereas no house was intended to be built. Mr. Wells, solicitor, prosecuted; Mr. Williams, solicitor, defended:—

Mr. Wells said at the end of last year or the commencement of this, Mr. Cooper was applied to by the defendant to know if he would tender for the erection of a house at Barnet Common. If he would, he was to send 5*s.* to him for the bill of quantities. Mr. Cooper replied that he would tender, sent the 5*s.*, and duly received the bill. At the foot of the bill it was stated that the surveyor's charges for the quantities would be two per cent., to be paid out of the first instalment, and 5*l.* 5*s.* in addition for incidental expenses. On January 17th last, Mr. Cooper delivered the tender to Mr. Reed. He did not hear from the defendant until February 21st, when the defendant informed him that his tender for 1,363*l.* was accepted. Mr. Cooper asked him for whom the house was to be built. The defendant replied that it was for a client of his named Williams. Mr. Cooper remarked, "I suppose he is all right?" to which the defendant replied, "He is a very good man indeed." After advancing 17*l.* on account of the payment for quantities, Mr. Cooper discovered that no such house was to be built. The Bench committed the defendant for trial at the June Sessions of the Central Criminal Court, but agreed to accept bail, himself in 40*l.*, with two sureties in 20*l.* each, or one surety in 40*l.*

"Great Paul."—Just before going to press on Thursday evening, we made inquiries at St. Paul's Cathedral as to the progress made towards getting the great bell into its destined position. We found that it had been got fairly inside the doorway of the tower (with only about half an inch to spare, after cutting away the masonry at the bottom of each side of the door), and that, still on its wooden platform, it was being pushed by powerful screw-jacks up the inclined way (necessitated by the rising of the arch of the crypt) to the centre of the lower landing of the great staircase. This position it was expected to reach an hour or two later. The two ropes, each 6 in. in circumference, and which have been lent by the authorities of H.M. Ordnance Department, Woolwich, are, with the other tackle and appliances required, in position ready for hauling up the bell, which operation is expected to be commenced this (Friday) morning, the 26th, and to last from eighteen to twenty-four hours. The operations are being carried out under the superintendence of Mr. F. C. Penrose, the surveyor to the Dean and Chapter, who has been unremitting in his anxious labours. Mr. Taylor, of Loughborough (a member of the firm from whose foundry the bell comes), is also present to render help.

Royal Italian Opera House.—A genuine delight was expressed by a very crowded house on Monday last with the opera "Mignon," as produced at Covent Garden. Madame Albani (*Mignon*) was truly in full song, and well deserved the applause bestowed. Her acting also was in good keeping with her vocalisation. The lateness of the hour when the opera would terminate was no doubt the reason why more *encores* were not enforced. We must also offer a word of praise to Madame Valleria (*Filina*), and also to M. Gailhard (*Lotario*). There appeared a nervousness on the part of Signor Lestellier (*Guglielmo*) which caused a weakness in his voice. The opera was well mounted, but the dance of the Gipsies might be improved. The main interest, however, on Monday evening centred in the *Mignon* of Madame Albani, which was a truly delightful performance.

King v. The Mayor, Corporation, &c., of Leamington.—On this special case being called on, in the Queen's Bench Division of the High Court of Justice on Tuesday last (before Mr. Justice Manisty and Mr. Justice Watkin Williams), Mr. Webster, Q.C., on the part of the plaintiff, was happy to inform the Court that an arrangement had been come to between his learned friend, Mr. Mellor, Q.C. (who appeared for the defendants) and himself, and judgment would be entered by consent for the plaintiff for 1,000*l.*, each party to pay their own costs. The action was brought to recover the balance of an account for and labour done, &c., under a contract to erect waterworks at Leamington. The defendants contested their liability on the ground that the contract was not under seal, and judgment was so entered accordingly.

Queenborough Pier, near Sheerness, the property of the London, Chatham, and Dover Railway Company, by whom it was used for their Continental traffic *viâ* Flushing, was totally destroyed by fire on the afternoon of the 19th inst. The cost of the pier is stated at 60,000*l.* Unfortunately, one of the *employés* of the Company, named Harry Histed, met his death in the disaster. At the inquest held on his body, evidence was given to show that the fire originated under the baggage-room, but there was nothing to show how it occurred. There was no luggage in the room, and there were no inflammable goods on the pier. The inquest was adjourned for a week.

Diachromos.—This is the name given by Mr. Henry Chalk Webb to the results of his patented invention for staining wood, for the sale of which a limited liability company, with offices at 49, Finsbury-pavement, has been formed. The invention consists in so staining wood as to resemble specimens of hand-painting or inlaid wood, at one-fourth the cost of the latter processes. As the name signifies, the colour perforates the wood, rendering it practically indestructible. It is applicable to every species of decorative household furniture. It is specially suitable for flooring, and contracts have already been entered into for thus ornamenting two churches, besides many banks and other buildings.

Helliwell's Patent Roof Covering.—The weak places in roofs covered with corrugated or plain galvanised iron sheets are where holes are punched in them for the rivets and nails used for fixing them; the metal there begins to corrode and wear away. By Mr. Helliwell's new patent system none of these holes are required, and these materials may be used in many cases in lieu of slated roofs with much advantage. The system adopted seems a very good one. It allows for contraction and expansion, and the work can be easily taken to pieces for removal.

The Mersey Tunnel.—On Tuesday, the Select Committee of the House of Commons sanctioned a Bill for the construction of a railway on each side of the river in continuation of the tunnel. The railway on the Liverpool side will pass from its connexion with the tunnel, under St. James-street, Lord-street, and Church-street, and form a junction with the Midland Central Station. On the Birkenhead side the railway from the tunnel will form a junction with the Chester and Birkenhead line, the joint property of the London and North-Western and Great Western Companies.

The Leamington New Theatre.—The memorial stone of a new theatre at Leamington has been laid by Lord Brooke, M.P., in the presence of a large assembly of spectators. The new building is in Regent Grove, near the Holly Walk. Messrs. Osborn & Reading, of Bennett's Hill, Birmingham, and Mr. Phipps, London, are the architects; and Mr. John Fell, of Bedford-street, Leamington, is the contractor. The contract is for a little over 7,000*l.*, and it is intended to open the theatre early in the autumn.

Blythburgh Church, Suffolk.—An endeavour is being made to raise funds for saving this church. It is in the eastern part of the county of Suffolk. The secretary of the committee writes,—"It is one of the finest specimens of semi-Flemish thirteenth-century architecture in this country, and the committee seek the assistance of those who would regret to think that such a fabric should become a ruin, and this will be inevitable in the course of a very short time, unless an immediate effort be made to avert such a catastrophe." Mr. A. W. Blomfield, M.A., has been spoken to on the subject.

Liverpool.—At the meeting of the Mersey Docks and Harbour Board, on the 11th inst., Mr. Guion stated that the pressure on the Board's accommodation for vessels was unprecedented, and notwithstanding the large area of dock accommodation recently opened at the north end of the city by the Prince and Princess of Wales, the Board was still short of the space that was required at their hands. Under these circumstances it had been arranged that the Herculaneum Dock should be devoted to the use of shipowners pending the decision of the Board as to deepening it.

The Female School of Art.—The prizes gained by the students of this school were distributed by Sir Phillip Cunliffe Owen on Wednesday last. We will give some particulars in our next.

Alleged Jobbery in the Rotherhithe Vestry.—Readers of local journals published in the suburbs of London are but too familiar with the reports of unruly proceedings at the meetings of vestries, boards of guardians, and other authorities. The Rotherhithe Vestry has acquired an unenviable pre-eminence for disorderly "scenes," and therefore not much weight will not be attached to the insinuations made against the surveyor of that body at its last meeting. Referring to the St. Helena Gardens Estate, Mr. Williams charged a member of the Vestry with instructing the surveyor to look after his interests in reference to this estate. At a later period in the proceedings, Messrs. Finney, Bruff, & Co., appeared before the Vestry with plan and application to build on the St. Helena Estate. Mr. Hames said they (Messrs. Finney, Bruff, & Co.) had obtained the sanction of the Metropolitan Board to their proposal, but that sanction had been afterwards withdrawn through the influence of the surveyor of that parish.—Mr. Legg said the Board were not aware that they (the applicants) were proposing to enclose a part of the public right of way. Some mutual recriminations having taken place between Mr. Hames and Mr. Legg across the able, Mr. Williams charged Mr. Legg with acting for a member of that Board in order to make his property more valuable.—Mr. Legg said the fact of the matter was that Mr. Williams was suffering from pique because he could not obtain what he wished in reference to property in which he was interested.—Mr. Hames said Mr. Bulmer had written to him, stating that Mr. Legg represented him in a certain piece of land.—Mr. Bulmer said the facts of the case were very simple. When Mr. Bruff purchased this property (St. Helena Gardens), he wrote to him (Mr. Bulmer) stating that he wanted to buy a piece of land in his possession. He (Mr. Bulmer) saw Mr. Hames, and showed him the piece of land. They could not agree as to price. He made an offer for an exchange, which he (Mr. Bulmer) did not think was a satisfactory exchange, and offered him a price which he could not take. Finding he could not come to terms himself, he told Mr. Hames that he had placed the matter in the hands of Mr. Legg, and if he could agree with him, he (Mr. Bulmer) would be satisfied. That was a business transaction, and nothing more.

The Architectural Association.—At the meeting of this Association on the 19th inst., Mr. E. G. Hayes was nominated as President for session 1882-83.

TENDERS

For the erection of school-buildings, Old Bedford-road, Luton. Messrs. J. R. Brown & Humphreys, architects. Quantities by the architects:—

W. Dunham, Luton	£1,400 0 0
Priestley & Gurney, London	1,375 0 0
Underwood, Wellingborough	1,360 0 0
Twelvetrees, Biggleswade	1,355 0 0
White, Dunstable	1,354 0 0
Beale, London	1,295 0 0
Jones & Co., Gloucester	1,288 0 0
Foster, Bedford	1,241 0 0
Robinson, Dunstable	1,239 10 0
Ireson, Northampton	1,229 0 0
D. Dunham, Luton	1,220 0 0
Redhouse, Baldock	1,181 0 0
Lissaman, Leamington	1,170 0 0
Smart Bros., Luton	1,150 0 0
Spencer, Atherstone (accepted)	1,120 10 0

For the erection of school-buildings, Hitchin-road, Luton. Messrs. J. R. Brown & Humphreys, architects. Quantities by the architects:—

Priestley & Gurney, London	£4,570 0 0
Trelvetrees, Biggleswade	4,478 0 0
W. Dunham, Luton	4,375 0 0
Underwood, Wellingborough	4,366 0 0
Beale, London	4,285 0 0
Foster, Bedford	4,285 0 0
Ireson, Northampton	4,195 0 0
Jones & Co., Gloucester	4,190 0 0
D. Dunham, Luton	4,040 0 0
Redhouse, Baldock	4,038 0 0
Robinson, Dunstable	3,913 0 0
Smart Bros., Luton	3,900 0 0
Lissaman, Leamington	3,880 0 0
Spencer, Atherstone (accepted)	3,670 0 0

For rebuilding the Wyndham Arms, Windmill-street, Camberwell, for Messrs. Watney & Co. Mr. C. W. Bovis, architect:—

Patman & Fotheringham	£4,473 0 0
Anley	3,990 0 0
Spencer & Co.	3,687 0 0
Taylor	3,487 0 0

For alterations to the Victoria public-house, Chalton-street, Somers-town, for Mr. Nathan Robinson. Mr. W. T. Farthing, architect:—

Spencer & Co.	£575 0 0
Jackson & Todd	525 0 0
Pittersgill	416 0 0
Lamble	412 0 0
Stead, Bros.	372 10 0

For making new roads and sewers on the Hengistbourne Estate, Boscombe, for the Boscombe Conservative Co-operative Land and Building Society, Limited. Mr. R. G. Pinder, surveyor:—

	Roads.	Chalk.	Kerbing and Guttering.	Sewers.	Twenty-one Catchpits.	Manhole.	Ventilating Shafts (each).	Concrete Casing, per yard run.	Total.
	£ s.	£ s.	£ s. d.	£ s. d.	£ s. d.	£ s.	£ s.	s. d.	£ s. d.
H. Pond	273 0	102 10	271 8 3	474 2 2	43 0 0	6 6	2 2	5 0	1,170 13 5
Hoare Bros., & Walden	390 0	139 0	363 9 0	229 18 0	61 18 6	9 6	2 0	2 8	1,126 14 8
W. H. Saunders (accepted)	199 5	100 10	299 3 4	179 0 0	47 5 0	10 10	2 5	4 0	838 2 4

For additions and alterations to printing and lithographic works in Tontine-street, Hanley, for Messrs. Albert & Daniel. Messrs. Keates & Bradford, architects. Quantities by the architects:—

J. F. Ledoux, Hanley	£1,173 0 0
T. Godwin, Hanley	1,158 0 0
J. Roberts, Hanley	1,100 0 0
C. Cornes, Hanley	1,099 17 6
J. Gallimore, Newcastle-under-Lyme	1,035 0 0
H. & R. Inskip, Longton	1,035 0 0
J. T. Clark, Hanley	1,010 0 0
J. Grosvenor, Tunstall	950 0 0
E. Gibson, Tunstall (accepted)	844 8 0

For the erection of two houses, Regent-road, Great Yarmouth, for Mr. J. N. Arbon. Messrs. Bottle & Olley, architects:—

Bricklayer's Work.

J. Harbord	£900 0 0
T. Howes	658 0 0
W. Rouse	645 10 0
Beech & Cork (accepted)	620 0 0

Carpenter's Work.

Springall	£394 0 0
Want	387 0 0
Isaacs	373 0 0
Bray	349 0 0
Davey	340 10 0
Harbert (accepted)	299 0 0
Knights	258 10 0

Plumber and Painter's Work.

Rainer	£62 18 0
Minns	60 18 0
Green	57 0 0
Dyson (accepted)	46 19 0

For making up Carlisle-road and Lancaster-road South, for the Hornsey Local Board. Mr. T. De Courcy Meade, surveyor:—

	Carlisle-road.	Lancaster-road South.
Strachan & Co., Wood-green	£92 13 0	£199 0 0
Dunmore, Crouch-end	93 0 0	197 0 0
Pizzey, Hornsey	85 0 0	165 0 0
Hawkins & Son, Finsbury Park	80 0 0	165 0 0
Bloomfield, Tottenham	78 3 0	158 8 0
Jackson & Son, Finsbury Park	79 0 0	156 13 0

For building a villa residence at Woodford Wells, for Mr. D. Schwinge. Mr. Edward Brown, architect:—

Marr	£1,335 0 0

For alterations at the Boar's Head, Stratford, for the Alma Brewery. Mr. Edward Brown, architect:—

Belcher & Ulmer	350 0 0

For proposed new mission-hall, Earle-road, Liverpool, comprising large hall, to seat 500 people, with class-rooms, &c., and with octagon spire, covered with oak shingles. Mr. James W. Crotts, architect. Quantities by Mr. H. B. Bare:—

Roberts & Robinson	£3,245 0 0
Hughes & Stirling, Bootle	2,992 0 0
R. Ritchie, Birkenhead	2,933 9 0
W. H. Forde, Birkenhead	2,870 0 0
E. Gabbutt	2,855 0 0
Bleakley & Son, Birkenhead	2,800 0 0
W. Tomkinson & Sons	2,797 0 0
J. Reddie	2,720 0 0
J. Henshaw	2,648 0 0
H. Yates	2,633 0 0
Brown & Brockham	2,628 0 0
T. Tyson	2,585 12 0
Thornton & Sons	2,585 0 0
Nicholson & Ayre (accepted)	2,478 13 6

For the construction of tramways between the pier and Tyne Docks, a distance of 2½ miles, the total length taken as a single line being 3½ miles, gauge 3 ft. 6 in., for the Corporation of the borough of South Shields. Mr. Matthew Hall, borough engineer:—

J. Gowans, Edinburgh (accepted)	£12,244 1 6

For office-fittings of the Bedford branch of the London and County Banking Company, Limited. Messrs. Usher & Anthony, architects:—

Rider & Son	£320 18 0
Wells & Co. (accepted)	254 6 0

For alterations and additions to the South Norwood Board Schools for the Croydon School Board. Messrs. Rutley & Blackwell, architects. Quantities supplied:—

E. Ward	£2,383 0 0
J. & C. Bowyer	2,296 0 0
Maides & Harper	2,287 0 0
Haward Bros.	2,246 0 0
Hearle & Son	2,170 0 0
Castle	2,170 0 0
Martin Taylor	2,138 0 0
Marriage	2,040 0 0
Page	1,920 0 0
Hollidge & Stuart	1,847 0 0
Smith & Sons (accepted)	1,818 0 0

For alterations and additions to residence and farm buildings at Chelsham, Surrey, for the Rev. S. B. Crowther-Beynon. Messrs. Rutley, architects:—

E. Ward	£604 0 0
R. G. Battley	548 0 0
Hunter & Bryant	551 0 0

For residence on the Bayhorne Estate, Horley, for Mr. R. B. Evered. Messrs. Rutley, architects:—

J. & C. Bowyer	£2,945 0 0
R. G. Battley (accepted)	2,734 0 0

For the erection of new premises in Broad-street Reading, for Mr. John Belcher. Messrs. Brown & Albury architects:—

Higgs	£1,850 0 0
Denton	1,789 0 0
Simonds	1,778 0 0
Lewis	1,760 0 0
Kingerlee	1,689 0 0
Wernham (accepted)	1,650 0 0

For the erection of new show room in rear of Nos. 108 and 109, Broad-street, Reading, for Messrs. Heelas, Sons & Co. Messrs. Brown & Albury, architects:—

Sheppard	£1,393 0 0
Woodroffe	1,270 0 0
Bottrill	1,258 0 0
Wernham	1,148 0 0
East & Sons	1,148 0 0
Kingerlee (accepted)	1,095 0 0

For the erection of a residence at Milverton, Leamington. Messrs. Brown & Albury, architects:—

G. F. Smith	£1,300 0 0
W. Sissaman	1,197 0 0
W. Gascoyne	1,030 0 0
R. Bowen	982 0 0
T. Mills (accepted)	975 0 0

For additions and alterations to the "British Workman," Abbey-square, Reading, for A. Sutton, Esq. Messrs. Brown & Albury, architects:—

Searle	£2,186 0 0
Higgs	2,070 0 0
Weaver	1,970 0 0
Denton	1,880 0 0
Kingerlee	1,865 0 0
Strong Bros.	1,830 0 0
Bottrill (accepted)	1,793 0 0

For alterations and additions at the Shirland Hotel, Shirland-road, Maida Vale, W., for Mr. Dickinson. Mr. George Treacher, architect. Quantities by J. F. Wesley:—

Oldrey	£1,649 0 0
Slater	1,454 0 0
J. Beale (accepted)	1,290 0 0
Chapman	1,257 0 0

Pewtering.

Ellen	£84 17 0
Watts	84 7 0
Heath	90 0 0
H. T. Warne (accepted)	68 0 0

For proposed residence for Mr. R. Green, Woburn Bucks. E. W. Stephens, architect:—

Timothy Godwin (Reading)	£3,375 0 0
William Woodbridge (Maidenhead)	2,891 0 0
Silver Sons & Filewood (Maidenhead)	2,856 0 0
George H. Gibson (High Wycombe)	2,585 17 9
Charles H. Hunt (Amersham Hill)	2,573 0 0

For the erection of a Working Men's Club House in the Steyne, Acton, for the Rev. C. M. Harvey, M.A. Mr Edward Monson, Jun., architect:—

Henry Hunt, Barnes (accepted)	£974 0 0

For the erection of stabling, &c., at Brewery House, Hayes, for Mr. Joseph Shepherd. Mr. Edward Monson, Junr., architect:—

William Hunt, Hayes (accepted)	£397 0 0

For building house, ale stores, stable, cart sheds, &c., at Wellingborough, for Messrs. Truman, Hanbury, Buxton & Co.:—

Underwood (accepted).

For the erection of a screen wall at No. 211, Marylebone-road. Mr. Robert Willey, architect:—

Outhwaite & Son (accepted)	£299 0 0

For alterations at "The Poplars," Seven Sisters-road. Messrs. Gordon & Lowther, architects:—

Phillips & Son	£2,185 0 0
Patman & Fotheringham	1,990 0 0
Clarke & Bracey	1,964 0 0
Taylor & Parfitt	1,859 0 0
Little	1,823 0 0
Dye (accepted)	1,700 0 0

For completing two semi-detached residences in Beaumont-road, Bedford Park Estate, Turnham Green, for Mr. Samuel Warde. Mr. Frank Goldring, architect:—

Grover	£450 0 0
Wright	425 0 0
Roberts (accepted)	395 0 0

For the erection of the Royal Courts of Justice Chambers, in the Strand. Mr. Wimble and Mr. Goymour Cuthbert, joint architects:—

Adamson & Sons	£53,446 0 0
Hall, Beddall, & Co.	53,420 0 0
Colls & Son	53,296 0 0
Brass	53,219 0 0
Scrivener & Co.	52,972 0 0
Fish & Co.	52,760 0 0
McLachlan & Sons	52,470 0 0
Ashby & Horner	51,936 0 0

For new infirmary, West Bromwich Union. Mr. W. Henman, architect, Birmingham. Quantities by Mr. Chas. Henman, jun.:—

H. Smith & Son, West Bromwich	£13,300	0	0
Bradbury & Co., Wolverhampton	13,215	0	0
J. Inwood, Malvern	12,997	0	0
J. Smith & Son, Birmingham	12,990	0	0
Jeffery & Son, Birmingham	12,980	0	0
W. Bennett, Birmingham	12,762	0	0
W. Robinson, Birmingham	12,680	0	0
T. & H. Herbert, Leicester	12,550	0	0
G. H. Marshall, West Smethwick	12,544	0	0
J. Moffatt, Birmingham	12,403	0	0
W. J. Webb, Birmingham	12,340	0	0
J. Garlick, Saltley	11,958	0	0
R. Price, Shrewsbury	11,900	0	0
J. Jones & Son, Sedgley	11,715	0	0
C. A. Horton, Brierley Hill	11,698	0	0
W. T. Bennet, Birmingham	11,470	0	0
J. Mallin, West Bromwich	11,397	0	0
E. Gibson, Tunstall	11,340	0	0
Trow & Son, Wednesbury	11,196	0	0
G. Widdowson, Saltley	11,000	0	0
Stockton & Son, Oldbury (accepted)	10,800	0	0

For rebuilding Nos. 35, 37, and 38, Aldersgate-street, for Mr. B. Dorrington. Messrs. Taylor & Locke, architects; Mr. H. Lovegrove, surveyor:—

R. Conder	£10,028	0	0

For further additions to Christ Church Schools, Newcastle, for the trustees. Mr. Arthur Plummer, architect:—

Barnup	£390	12	0
Mitchison & Co.	375	19	0
Burton	360	0	0
Southern	349	0	0
Baston	345	6	0

For alterations and repairs to St. James's Church, Hampstead-road. Mr. Ernest Shum, architect:—Langmead & Way (accepted).

For a mansion, called Collyers, at Peterafield, for Lieut.-Colonel Shuttleworth. Messrs. Bateman & Keates, architects. Quantities by Mr. Peiler:—

Norris, Sunningdale	£8,350	0	0
Colls & Son, Camberwell	8,222	0	0
Elliott, Newbury	7,522	0	0
Kimberley, Banbury	7,000	0	0
Bull & Sons, Southampton	6,921	0	0
Crook, Southampton	6,917	0	0

For the erection of the first portion of the infants' school, St. Andrew's, Plaistow, Essex. Mr. James Brooks, architect. Quantities supplied by Messrs. E. L. Curtis & Sons:—

Hearle & Son	£1,393	0	0
Cox	1,392	0	0
Norton	1,389	0	0
Morter	1,365	0	0
Reed	1,320	0	0
Gregory	1,320	0	0
Patman & Fotheringham	1,300	0	0

For bridge over the river Stour at Tuckton, near Christchurch, Hants, with approaches, for the Tuckton Bridge Company. Mr. Tom Stevens, engineer. Quantities supplied:—

Butler, Leeds	£4,160	0	0
Dixon & Thorne, London	4,037	0	0
Dyne, Steel, & Co., Newport	3 548	0	0
Perkins, Lymington	2,994	0	0
Jukes, Coulson, & Co., London	2,994	0	0
Heare Bros. & Walden, Bournemouth	2,837	0	0
Jenkins & Son, Bournemouth	2,788	0	0
Vernon & Ewens, London	2,750	0	0
Hill & Co., Gosport	2,750	0	0
Shaw & Co., London	2,495	0	0
Hayter, Portsmouth (accepted)	2,200	0	0

For additions to factory at 128, New Kent-road, for Mrs. Thwaites. Messrs. Muggeridge & Powell, architects:—

Riddell	£422	0	0
Burman	399	0	0
Fisher (accepted)	350	0	0

For alterations to shops, Nos. 33 & 35, York-road, Battersea, for Mr. Marshall. Messrs. Muggeridge & Powell, architects:—

Fisher	£240	0	0
Riddell	237	10	0
Burman (accepted)	214	0	0

For alterations at the Prince of Wales, Kentish Town, for Mr. Wells. Mr. Edward Brown, architect:—

W. Pringle	£497	0	0
Mattock Bros.	485	0	0
J. Oldis	449	0	0
R. Marr	425	0	0
Belcher & Ullmer	380	0	0
S. Salt (accepted)	350	0	0
Plasterer's Work.			
J. G. Edwards	£61	0	0
R. Pringle	59	18	0
W. Rogers	58	3	0
T. Heath (accepted)	54	10	0

For alterations and repairs at No. 94, Earl's Court-road, South Kensington. Mr. J. H. Rowley, architect:—

Ashby	£373	14	0
W. H. Smith	330	0	0
Homann & Son	315	0	0
Lucas & Son (accepted)	305	0	0

For repairs to premises, Lock-street, Leighton Buzzard. Mr. Frederick Gotte, architect:—

T. P. Webb, Leighton Buzzard	£430	0	0
W. Whiting	367	7	0
David Cook & Sons, Leighton Buzzard	229	0	0
Thomas Gibbs, Leighton Buzzard	213	10	0

For alterations to Nos. 48, 49, 50, & 51, Camelia-street, Wandsworth-road, for Messrs. H. & A. Phillips. Messrs. Muggeridge & Powell, architects:—

Riddell	£977	15	0
Taylor	954	0	0
Burman	914	0	0
Castle	868	0	0
Fisher	849	0	0
Tyerman	814	0	0
Whitby	760	6	5

For rebuilding stabling at rear of King William the Fourth Tavern, Grosvenor-road, Pimlico, for Mr. Thomas Barrett. Mr. Charles Jones, architect:—

		Less.*		
Wissor	£487 10 0	...	£7	0 0
Coulthard	436 0 0	...	26	0 0
G. T. Smith & Son	419 0 0	...	40	0 0
Hooper	395 0 0	...	34	0 0
Pickersgill	393 0 0	...	20	0 0
Heath (accepted)	359 0 0	...	21	0 0

* Deductions if old materials are re-used and bales in lieu of stall divisions.

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